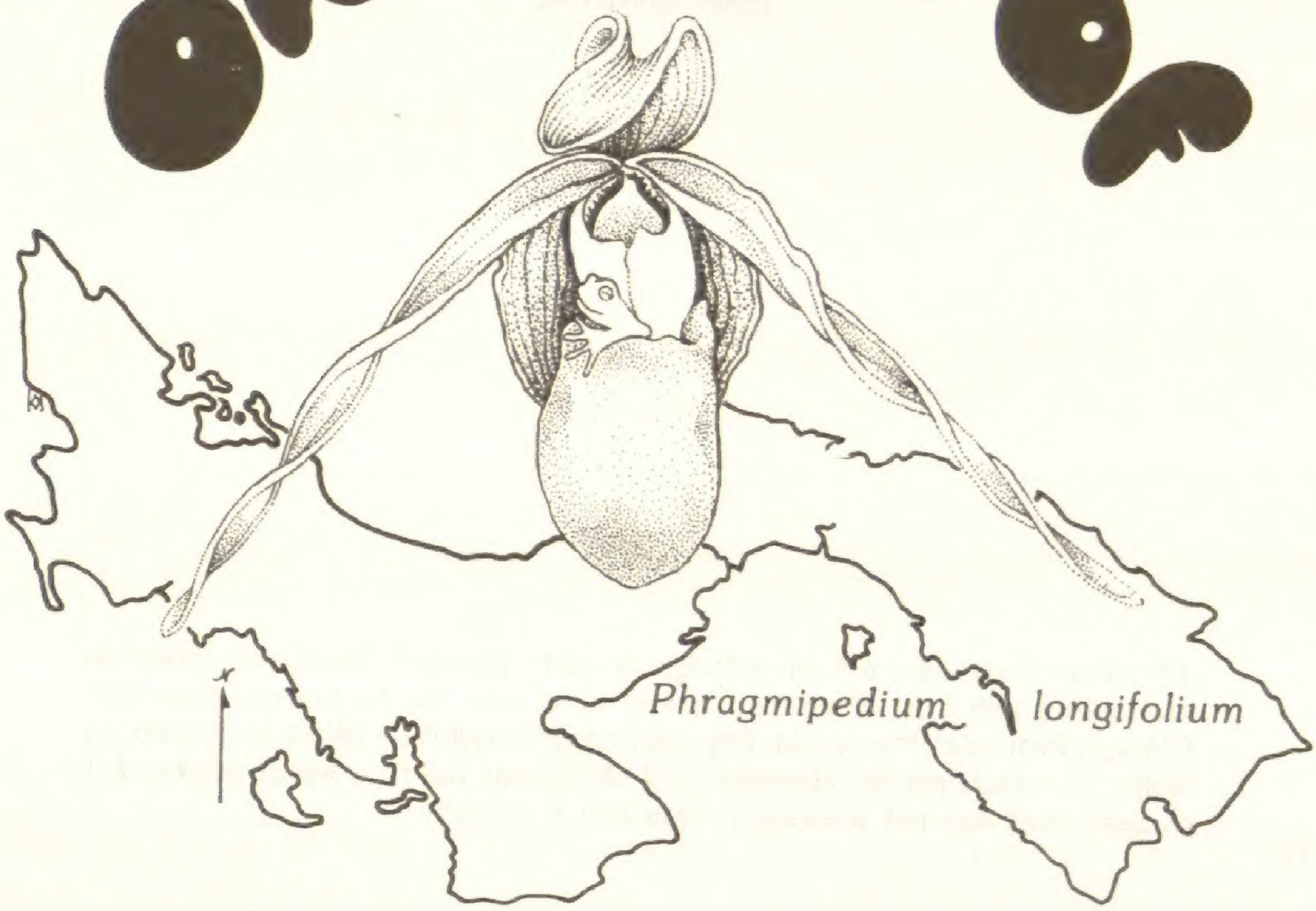
REF
QK1
.M833
1980
v.4
c.3

ORCHIDS OF PANAMA



A Facsimile Reprint of the Orchidaceae, *Flora of Panama*
by Louis O. Williams and Paul H. Allen
with
A Checklist of the Orchids of Panama as Known Today
by Robert L. Dressler

Missouri Botanical Garden

MISSOURI BOTANICAL
GARDEN LIBRARY

1980

MONOGRAPHS IN SYSTEMATIC BOTANY
from the Missouri Botanical Garden
Volume 4. November 1980.

ISSN 06161-1542

The cover illustration is from a design by Barry Hammel, based on a collection and photograph from along the Chiriqui River near the La Fortuna Dam site, Chiriqui Province. The orchid, *Phragmipedium longifolium* (Warz. & Reichb. f.) Rolfe, is vouchered by *Hammel 2293* (MO), but the frog which inhabited it escaped and was not identified.—Marshall R. Crosby

Copyright © 1980 by Missouri Botanical Garden.
All rights reserved.

Assisted by National Science Foundation Grant DEB 77-04300 (W. G. D'Arcy, principal investigator).

Printed in the United States of America by
Braun-Brumfield, Inc., Ann Arbor, Michigan.

CONTENTS

Preface by W. G. D'Arcy vii

Flora of Panama, Orchidaceae *107*

Index *583*

Checklist of the Orchids of Panama by Robert L. Dressler I

PREFACE

The Orchidaceae, *Flora of Panama,* was published in four parts in the ANNALS of the Missouri Botanical Garden, appearing in 1946 and 1949. The treatment was reprinted in 1965 by Stechert-Hafner Service Agency, but that supply has long been exhausted. The present edition includes a facsimile reprinting of the original treatment plus a checklist to the orchids of Panama by Dr. Robert L. Dressler. This checklist includes additions to the orchid flora since the original publication and provides modern names where there have been changes. The introduction to the checklist gives a brief overview of the orchid flora.

The authors of the original work were Louis Otho Williams and Paul H. Allen. Dr. Williams relates that he wrote the first half of the treatment at the Orchid Herbarium of Oakes Ames, Harvard University, in 1942, but publication was delayed when he went to Brazil for four years at the end of 1942 to study wartime rubber resources. In 1946 he returned to Harvard for a short time before going to Honduras where he remained for eleven years. During his brief stay at Harvard following the war, publication of the first two parts of the Orchidaceae was arranged. Dr. Williams was born in 1908 in Jackson, Wyoming, and he is now living in retirement near Rogers, Arkansas.

The second half of the treatment was written by Paul Hamilton Allen, who joined the staff of the Missouri Botanical Garden after returning from a wartime study of rubber resources in Colombia. Dr. Allen went to Harvard in 1946 to study the orchid material there. His portion of the treatment was published in 1949. Dr. Allen was born in 1911 at Enid, Oklahoma, and he passed away in New Orleans in 1963.

The checklist has been prepared by Dr. Robert L. Dressler of the Smithsonian Tropical Research Institute, Balboa, Panama. From a staff position at the Missouri Botanical Garden, Dr. Dressler went to Panama in the autumn of 1963, where he has remained since, becoming a foremost expert on the world's orchids. He has published several books and many papers on orchids, and thanks to his active field studies, he is familiar with most parts of Panama and the orchids that grow there.

Although the *Flora of Panama* was published at intervals beginning in 1943 in the ANNALS of the Missouri Botanical Garden, it was originally conceived as a self-contained unit which could be removed from the ANNALS and used as a series of separate volumes. Thus, the *Flora* was divided into parts initially, and

the parts were provided with a system of double pagination: that of the ANNALS, in roman at the top corners of pages, and that of the *Flora*, in *italic*, centered at the bottom of pages. This facsimile reprint retains both paginations for the following reasons. The practice of providing separate pagination for the *Flora* was later discontinued, and only the pagination of the ANNALS was used. Since later parts of the *Flora* lack the separate pagination, citations for all parts of the *Flora*, including the Orchidaceae, should be to the volumes and pages of the ANNALS, not to the pages of the *Flora*. However, the orchids appeared in two different volumes of the ANNALS with overlapping pages: 33: 1–140, 315–404 and 36: 1–132, 133–245. To avoid the need to cite separate volume and page numbers, the Index to the orchids (pages *583–590*) and Dr. Dressler's check list (pages I–XXVI) refer to the *Flora* pagination.

The publication history of the original work may be summarized as follows:

Flora of Panama, Part III	Fascicle 2 pp. *107–246*	Fascicle 3 pp. *247–336*	Fascicle 4 pp. *337–468*	Fascicle 5 pp. *469–581*
ANNALS of the Missouri Botanical Garden	Volume 33, pp. 1–140	Volume 33, pp. 315–404	Volume 36, pp. 1–132	Volume 36, pp. 133–245
Publication date	8 March 1946	7 December 1946	21 March 1949	18 June 1949
Author	L. O. Williams	L. O. Williams	P. H. Allen	P. H. Allen

——W. G. D'Arcy

FLORA OF PANAMA

Part III. Fascicle 2

ORCHIDACEAE

By LOUIS O. WILLIAMS

Epiphytic, terrestrial, rarely semi-aquatic or saprophytic, perennial herbs. Vegetative growth of two main types: (1) Termed MONOPODIALES, in which the main axis or stem grows steadily upward year after year, the annual growths at length being indistinguishable and a monopodium being formed; the inflorescences borne on lateral shoots. (2) Termed SYMPODIALES, in which a new growth develops laterally from the base of the previous year's growth, which is completed and matures in a few months. In the SYMPODIALES if the annual growth is terminated by an inflorescence the plant is termed *acranthous* (terminal flowering); if the inflorescence originates on lateral branches (usually at the base of or laterally on a pseudobulb) and the annual growth is terminated only by leaves the plant is termed *pleuranthous* (lateral flowering). Stems (secondary) of many orchids developed into thickened or swollen structures (pseudobulbs) which act as storage organs for food and moisture. Flowers hermaphroditic and gynandrous, occasionally monogamous or polygamous, the male and female ones being very different; zygomorphic; superior. Perianth of two tripartite whorls, alternating, often variously united; in the same whorl the even pair similar, the odd one usually different in form. Sepals 3, similar, or the dorsal differing from the laterals, free or variously united. Petals 3, two similar and termed petals, the other one usually strikingly different and termed lip or labellum. Stamens in two tripartite whorls, only one (MONANDRAE) or two (DIANDRAE) fertile, the others, along with the styles and sterile stigmas, forming the column by consolidation; in the MONANDRAE the odd stamen of the outer whorl fertile; in the DIANDRAE the paired stamens of the inner whorl fertile. Pollen (except in the CYPRIPEDILOIDEAE) usually consolidated into pollinia. Stigmas 3, usually only one or two fertile (if two, often confluent and appearing as one). The column, the central structure in the flowers, which is made up of the consolidated styles and filaments along with the suppressed anthers and stigmas, is diagnostic of the family. Fertile anthers and stigmas usually borne toward the apex of the column. Ovary 1-celled or rarely 3-celled. Seeds numerous, minute, lacking endosperm.

Issued March 8, 1946.

A cosmopolitan family of about 600 genera and 15,000–20,000 species. Most abundant in tropical regions of the world.

The Orchidaceae is an extremely complex family, the morphology of which is often not too well understood. The genera, in some groups, are technical and perhaps not too well differentiated; in other groups they are fairly well differentiated. With the exception of a few terrestrial genera and even fewer of the epiphytic ones, the respective genera are limited to either the eastern or to the western hemisphere. A few genera contain a very large number of species (*Dendrobium*, eastern hemisphere, probably more than 1000; *Epidendrum*, western hemisphere, possibly nearly 1000). The species of orchids, as a whole, are distinctive, and extreme variation within species is not too common. Terrestrial species, especially those of temperate climates, are inclined to be more variable than are epiphytic ones. Species are inclined to be restricted in distribution although terrestrials and epiphytes growing at low elevations often range widely.

The greatest concentrations of orchids occur within twenty degrees of the equator. While some are found at low elevations, the great majority of them grow on mountains within the tropics. Malaysia and tropical America are richest in species and genera, with Africa a poor third. New Guinea probably contains more species than any comparable land area, although it is still not well known botanically. Colombia is perhaps the richest in species of any comparable area in the western hemisphere.

KEY TO THE SUBFAMILIES, TRIBES AND GENERA

a. Stamens 2, a third usually transformed into a large staminode; pollen granular, not united into masses or bodies.....Subfamily DIANDRAE (Tribe I CYPRIPEDILOIDEAE)

aa. Stamen 1, the laterals abortive or forming staminodes; pollen consolidated into masses or solid bodies (pollinia).....Subfamily MONANDRAE

b. Caudicle and gland arising from the base of the pollinia; anthers erect or more or less resupinate, very closely adnate to the broad-based column, never deciduous after flowering; pollinia always granular (sectile) .....Tribe II OPHRYDOIDEAE

bb. Caudicle and gland arising from the apex of the pollinia; anthers erect or incumbent, the filaments short and slender, generally narrowly joined to the column, usually deciduous but if persistent soon withering.

c. Pollinia granular, soft; anthers commonly persistent but withering; inflorescence (normally) always terminal.....Tribe III POLYCHONDREAE

cc. Pollinia waxy or cartilaginous; anther commonly soon deciduous; inflorescence terminal or lateral .....Tribe IV KEROSPHAEREAE

I. Subfamily DIANDRAE, Tribe CYPRIPEDILOIDEAE. Two genera in Panama.

a. Stems elongated, leafy; leaves thin..... 1. SELENIPEDIUM

aa. Stems very short or apparently none, leaves coriaceous..... 2. PHRAGMIPEDIUM

II. Subfamily MONANDRAE, Division BASITONAE, Tribe OPHRYDOIDEAE.

a. One genus in Panama..... 3. HABENARIA

III. Subfamily MONANDRAE, Division ACROTONAE, Tribe POLYCHONDREAE. Twelve genera distributed in five subtribes in Panama.

a. Anther more or less prone, incumbent.

b. Leaves not articulated, persistent; stems not cane-like.
c. Terrestrial herbs with fleshy roots; small or large rather showy purplish flowers..... 4. POGONIA
cc. Scandent herbs, usually epiphytic, without fleshy roots; flowers large, usually white..... 5. VANILLA
bb. Leaves articulated, caducous; stems cane-like.
c. Pollinia 8.
d. Base of the lip strongly gibbous or subsaccate, ornamented with two prominent calli; flowers relatively small..... 6. ELLEANTHUS
dd. Base of the lip not strongly gibbous or subsaccate, with or without calli at the base; flowers relatively very large..... 7. SOBRALIA
cc. Pollinia 4..... 8. PALMORCHIS
aa. Anther more or less erect; rostellum erect or suberect.
b. Leaves not plicate-nerved, usually soft.
c. Roots fasciculated.
d. Lip uppermost, adaxial; flowers not resupinate.
e. Petals, and sometimes the lip, inserted on the column..... 12. PONTHIEVA
ee. Petals and lip not inserted on the column.
f. Lip inserted at the base of the column, free.
g. Sepals not united into a basal tube..... 11. CRANICHIS
gg. Sepals united at the base into a slender tube..... 9. STENOPTERA
ff. Lip united at the base to a cup formed of the united sepals, helmet-shaped..... 10. PRESCOTTIA
dd. Lip lowermost, abaxial; flowers resupinate..... 13. SPIRANTHES
cc. Roots not fasciculated, arising from the nodes on the lower part of the stem or rhizome..... 14. ERYTHRODES
bb. Leaves plicate-nerved, chartaceous or subcoriaceous..... 15. CORYMBORCHIS
IV. Subfamily MONANDRAE, Division ACROTONAE, Tribe KEROSPHAEREAE.
Seventy-two genera, distributed in twenty-six subtribes, in Panama.
a. Series A. ACRANTHAE. Inflorescence normally terminal or by abortion of terminal inflorescence axillary in uppermost leaves. (See also LOCKHARTIA).
b. Viscid disc, when present, arising from the apex of the pollinia, commonly irregular, rudimentary or none.
c. Ovary articulated to the pedicel; pedicel persistent; stems slender, rigid, sometimes reduced, usually unifoliate.
d. Sepals all distinctly connate at the base.
e. Sepals also connate at their tips, open between tips and bases.... 18. CRYPTOPHORANTHUS
ee. Sepals not connate at their tips.
f. Sepals forming a narrow or campanulate tube at the base.
g. Inflorescence a raceme..... 17. PHYSOSIPHON
gg. Inflorescence a single flower, or rarely 2 flowers..... 19. MASDEVALLIA
ff. Sepals more or less rotate, not forming a narrow tube at the base..... 16. STELIS
dd. Sepals not all distinctly connate at the base, at least the dorsal sepal free or nearly free.
e. Blade of the petal transverse, i. e. strongly bilobed (except *L. eximia*)..... 21. LEPANTHES
ee. Blade of the petal not transverse, not strongly bilobed.
f. Petals inserted on the column-foot; lip with a hood-shaped callus or ligule at the base..... 22. ACOSTAEA
ff. Petals not inserted on the column-foot nor with a hood-shaped callus or ligule at the base.
g. Inflorescence terminal or at least subterminal on the secondary stems..... 23. PLEUROTHALLIS
gg. Inflorescence originating about the middle of the secondary stems..... 20. SCAPHOSEPALUM
cc. Ovary not articulated to the pedicel; pedicel caducous with the flower; stems slender or fleshy, 1- to several-flowered.
d. Pollinia without appendages, i. e. no viscid disc or caudicle.
e. Column very short; anthers sessile in the clinandrium, erect.... 24. MALAXIS
ee. Column elongated; anther terminal, incumbent..... 25. LIPARIS
dd. Pollinia appendaged, i. e. with at least a rudimentary viscid disc or a caudicle with a viscid apex.

e. Column footless; lip more or less connate with the base of the column.
f. Pollinia 4, two in each cell of the anther.
g. Lip geniculate at its junction with the column..... 26. Hexisea
gg. Lip not geniculate at its junction with the column.
h. Flowers large and showy; stems always pseudobulbose.. 29. Cattleya
hh. Flowers usually not large and showy; stems either pseudobulbose or ebulbose.
i. Lip with two large hollow horn-like processes; lip free or nearly so..... 28. Diacrium
ii. Lip without hollow horn-like processes; lip commonly connate with the column at base but not always so..... 27. Epidendrum
ff. Pollinia 8, four in each cell of the anther.
g. Pollinia of two sizes, unequal..... 31. Brassavola
gg. Pollinia of one size, equal..... 30. Laelia
ee. Column produced into a distinct foot at the base; lip hardly connate to the column or at most connate at the base of the column-foot.
f. Pollinia 4 or 6.
g. Leaves distichous and scattered along an elongated stem.
h. Pollinia 6..... 33. Platyglottis
hh. Pollinia 4..... 34. Isochilus
gg. Leaves not distichous on an elongated stem, terminal from pseudobulbs or short indurated stems..... 32. Scaphyglottis
ff. Pollinia 8..... 35. Coelia
bb. Viscid disc distinct, regular, with the margins well defined, arising from the apex of the column.
c. Column with a foot; plants with pseudobulbs; pollinia 4, or 4 joined into two pairs.
d. Lip with a spur..... 37. Galeandra
dd. Lip without a spur..... 36. Polystachya
cc. Column footless; plants without pseudobulbs; pollinia 2..... 38. Epidanthus
aa. Series B. Pleuranthae. Inflorescence lateral, arising near the base of the pseudobulb or in the axils of the lower leaves or sheaths. (This series contains two subseries.)
A. Subseries a. Sympodiales. Plants forming a sympodium, i. e. the stems approximate or superimposed and the apical growth manifestly terminal.
B. Pollinia without a stipe; viscid disc commonly rudimentary or the apex of the caudicle glutinous or none.
C. Rhizome short; terrestrial plants with the stems bulbose, usually partially buried in the ground; leaves plicate.....
D. Lip with a spur..... 39. Calanthe
DD. Lip without a spur..... 40. Bletia
CC. Rhizome more or less elongated; plants epiphytic with pseudobulbose stems 1- to many-leaved; leaves plane or plicate.
D. Pseudobulbs homoblastic (i. e. of several nodes, only the terminal one of which bears leaves), fusiform, many-leaved; leaves plicate, thin; flowers relatively large..... 41. Chysis
DD. Pseudobulbs heteroblastic (i. e. of a single node with one or more terminal leaves), usually small; leaves coriaceous or fleshy, not plicate; flowers relatively small..... 42. Bulbophyllum
BB. Pollinia with a prominent stipe, sometimes short; viscid disc distinct.
C. Pollinia of a waxy texture, easily mashed.
D. Lip spurred or with a saccate base..... 43. Eulophia
DD. Lip not spurred nor saccate at the base.
E. Lateral sepals and column forming a prominent mentum; base of the leaves and peduncle not enclosed in a submembranaceous sheath..... 44. Warrea
EE. Lateral sepals and column-foot forming an inconspicuous mentum; base of the leaves and peduncle enclosed in a submembranaceous sheath..... 45. Govenia
CC. Pollinia cartilaginous in texture, not easily mashed.

D. Leaves convolute in vernation.
E. Pseudobulbs large, fusiform, homoblastic, many-leaved.
F. Flowers perfect, monomorphic; column twisted..... 46. MORMODES
FF. Flowers dimorphic or trimorphic (rarely perfect); column not twisted.
G. Column thick, straight, in male flowers usually with two retrorse antennae..... 47. CATASETUM
GG. Column slender, curved or arcuate, without retrorse antennae..... 48. CYCNOCHES
EE. Pseudobulbs short, heteroblastic, 1- to few-leaved.
F. Lip continuous with the base of the column or solidly attached to the short column-foot, not articulated, more or less prominently divided into an epichile and a hypochile or rarely entire.
G. Petals very much narrower than the sepals, usually inserted on the base of the column.
H. Epichile saccate and bucket-like..... 57. CORYANTHES
HH. Epichile not saccate..... 56. GONGORA
GG. Petals not distinctly narrower than the sepals, from a little narrower to broader.
H. Epichile saccate and bucket-like..... 57. CORYANTHES
HH. Epichile not saccate.
I. Lateral sepals connate and forming a distinct mentum at the base; flowers about 1.5 cm. long, fleshy..... 49. COELIOPSIS
II. Lateral sepals free or if connate not forming a distinct mentum at the base.
J. Lip entire..... 50. SIEVEKINGIA
JJ. Lip not entire, usually divided into a hypochile and an epichile.
K. Hypochile of lip concave-saccate; apex of lip shallowly 3-lobed, the epichile obscure..... 55. STANHOPEA
KK. Hypochile of lip usually not concave-saccate or if so then the lip distinctly divided and lobed.
L. Epichile or terminal lobe of lip narrowly lanceolate, acuminate..... 54. NEOMOOREA
LL. Epichile or terminal lobe of lip not narrowly lanceolate, acuminate.
M. Lateral lobes of the lip (pleuridia, mesochile) erect or at least not parallel to the epichile.
N. Rachis of inflorescence and sepals dorsally brown pilose-pubescent..... 51. KEGELIELLA
NN. Rachis of inflorescence and sepals not pubescent.
O. Lateral lobes of the lip joined by a large central callus; hypochile of the lip long, at least as long as the lateral lobes..... 52. ACINETA
OO. Lateral lobes of the lip not joined by a central callus; hypochile of the lip short and inconspicuous..... 53. PERISTERIA
MM. Lateral lobes of the lip (pleuridia) more or less parallel to the epichile, ensiform.... 55. STANHOPEA
FF. Lip articulated to the apex of the column-foot.
G. Inflorescence basal, i. e. arising from the base of the pseudobulb; lip usually provided with a long low callus.
H. Inflorescence consisting of a single flower..... 60. LYCASTE
HH. Inflorescence a few- to several-flowered raceme.
I. Flower with a conspicuous spur-like mentum..... 58. XYLOBIUM
II. Flowers without a conspicuous spur-like mentum.... 59. BIFRENARIA

GG. Inflorescence suprabasal, i. e. in the axils of the lower sheaths; lip usually provided with a transverse callus or crest ..... 61. ZYGOPETALUM

DD. Leaves conduplicate in vernation.

E. Column produced into a foot and forming a mentum with the lateral sepals; rostellum hardly produced, emarginate.

F. Callus of the lip transverse, often flabellate, at the base of the lip; inflorescence suprabasal, i. e. in the axils of the sheaths or sheath-like leaves; pseudobulbs reduced or rudimentary.

G. Callus at the base of the lip pectinate or fringed ..... 64. HUNTLEYA

GG. Callus at the base of the lip not pectinate or fringed.

H. Lip entire or but obscurely lobed ..... 62. CHONDRORHYNCHA

HH. Lip lobed, or divided into a narrow basal and a broad apical part ..... 63. WARSCZEWICZELLA

FF. Callus of the lip longitudinal, often inconspicuous or rarely none; inflorescence borne from the base of a pseudobulb; pseudobulbs often well developed or forming elongated stems.

G. Lateral sepals forming a spur at their base about as long or longer than the blades of the sepals ..... 67. CRYPTOCENTRUM

GG. Lateral sepals not forming a long spur.

H. Sepals connate and forming a short tube at the base; lip not half as long as the sepals ..... 66. TRIGONIDIUM

HH. Sepals not connate and forming a tube at the base; lip usually at least half as long as the sepals ..... 65. MAXILLARIA

EE. Column footless; rostellum commonly produced, sometimes subulate or acute.

F. Anther incumbent; rostellum porrect or deflexed, never ascending.

G. Base of the lip spurred or saccate or appendaged at the base.

H. Base of lip forming a spur or deeply saccate.

I. Lateral sepals free ..... 68. TRICHOCENTRUM

II. Lateral sepals connate ..... 70. RODRIGUESIA

HH. Base of the lip with short to long appendages; lateral sepals usually connate and commonly spurred or saccate at the base ..... 69. IONOPSIS

GG. Base of the lip neither spurred nor saccate nor with appendages.

H. Pollinia 2.

I. Clinandrium low, slightly excavated, margin entire and not hyaline.

J. Column winged near the stigma ..... 71. TRIZEUXIS

JJ. Column wingless near the stigma ..... 76. BRASSIA

II. Clinandrium with a high margin enfolding the anther or nearly so, or the column with spreading wings near the stigma.

J. Leaves articulated at the base.

K. Base of the lip enfolding the column and shortly adnate to it at its base ..... 72. TRICHOPILIA

KK. Base of the lip not enfolding the column.

L. Lip inserted on the column near the middle .. 75. ASPASIA

LL. Lip not inserted on the column near the middle.

M. Lateral sepals or all sepals and petals long-caudate; column not winged near the stigma ..... 76. BRASSIA

MM. Lateral sepals or all sepals and petals not caudate, or if so then column winged near the stigma.

N. Base of the lip forming a shallow sac .... 73. MESOSPINIDIUM

NN. Base of the lip not forming a shallow sac.

O. Column with a pair of narrow stelidia at the middle; lip usually unlobed, pandurate or retuse..... 79. LEOCHILUS
OO. Column lacking narrow stelidia at the middle; lip various.
P. Lip long-unguiculate; flowers small.. 80. SIGMATOSTALIX
PP. Lip not long-unguiculate; flowers usually not small.
Q. Lip erect and parallel or contiguous to the column at the base; calli on the lip usually 2, parallel and not joined; column usually not winged..... 74. ODONTOGLOSSUM
QQ. Lip spreading (usually approaching a right angle) from the column; calli on the lip various but if 2 then usually joined; column usually winged at the apex.
R. Lip usually relatively large and not sharply lobed, usually lacking calli except at the base; flowers white..... 77. MILTONIA
RR. Lip usually relatively small and distinctly 3-lobed, usually provided with calli above the base (as well as often at the base); flowers commonly yellow to maroon..... 78. ONCIDIUM*
JJ. Leaves not articulated, i. e. marcescent; plants with densely equitant-leaved, elongated stems, without pseudobulbs..... 81. LOCKHARTIA
HH. Pollinia 4; lip with a retrorse callus near the base..... 82. ORNITHOCEPHALUS
FF. Anther erect on the back of the column or erect on the apex of the column under the clinandrium; rostellum erect or ascending.
G. Column provided with stiff hairs..... 85. TELIPOGON
GG. Column not provided with stiff hairs.
H. Clinandrium margins small, not almost surrounding the anther..... 83. NOTYLIA
HH. Clinandrium margins large, almost forming a calyptra over the anther..... 84. MACRADENIA
AA. Subseries b. MONOPODIALES. Plants forming a monopodium, i.e. the stems having infinite apical growth.
B. Column with an infrastigmatic ligule; stems with equitant leaves.... 86. DICHAEA
BB. Column without an infrastigmatic ligule; stems not having equitant leaves, plants sometimes leafless..... 87. CAMPYLOCENTRUM

---

* *Oncidium, Miltonia, Odontoglossum, Brassia, Aspasia, Leochilus* and *Mesospinidium* are only one genus, naturally, for they merge completely. However for purposes of convenience they are best left apart. The first three mentioned are all well known and, except for borderline species, even the amateur can soon learn to distinguish them easily by their aspect.

1. SELENIPEDIUM Reichb. f.

Selenipedium Reichb. f. Xenia Orch. 1:3, *t. 2.* 1854; emend. Pfitz. in Engl. Pflanzenr. IV. 50 (Heft 12): 27. 1903.

Solenipedium Beer, Prakt. Stud. Orch. 310. 1854.

Tall terrestrial herbs with leafy, often branched stems. Leaves narrow, many-nerved, inarticulate. Inflorescence terminal, racemose, many-flowered. Flowers small to medium-sized, resupinate. Sepals spreading, the dorsal free, the laterals connate nearly to their apices. Petals smaller than the sepals, free. Lip calceiform, saccate. Column short, terete. Fertile stamens 2, the third stamen (staminodium) sterile. Stigma wider than the staminodium, papillose, trisulcate. Capsule fusiform, trilocular, crowned by the marcescent perianth.

One species in Panama.

1. Selenipedium chica Reichb. f. Xenia Orch. 1:3, *t. 2.* 1854; Pfitz. in Engl. Pflanzenr. IV. 50 (Heft 12): 27. 1903; Ames, Sched. Orch. 2:1, *t. 1.* 1923.

Stems leafy, erect, slender, up to about 5 m. tall. Leaves when mature 15–30 cm. long and 1.5–5 cm. broad, elliptic-lanceolate to lanceolate, acuminate, submembranaceous, many-nerved, inarticulate, sparsely pubescent dorsally, especially along the nerves, or becoming glabrate, contracted at the base into a cylindric sheath covering the stem. Inflorescence terminal, many-flowered, densely pubescent; flowers small to medium-sized, opening in succession, soon deciduous if not fertilized; bracts normally 10–15 mm. long, lanceolate, acute, puberulent. Dorsal sepal about 2 cm. long and 1 cm. broad, elliptic-oval, acute, puberulent dorsally toward the base. Lateral sepals together about 2 cm. long and 1 cm. broad, elliptic-oval, acute, connate nearly to their apices. Petals up to 2 cm. long and about 2 mm. broad, linear, puberulent dorsally along the mid-nerve and within near the base. Labellum 2–3 cm. long and 1–1.8 cm. broad in natural position, calceiform, margins strongly involute.

Endemic in Panama.

"Panama": without data, *Duchassaing*. Panamá: in foothills 20 miles northeast of Panama City, alt. 60–90 m., *Powell 258*; northeast of Panama City, *Powell 3007*. Canal Zone: Ancon Hill, *Killip 3043*; Cañon of Río Chagres, alt. 70–80 m., *Steyermark & Allen 17506*.

This is undoubtedly the largest terrestrial orchid in the Americas.

2. PHRAGMIPEDIUM (Pfitz.) Rolfe

Phragmipedium (Pfitz.) Rolfe in Orch. Rev. 4:331. 1896; Pfitz. in Engl. Pflanzenr. IV. 50 (Heft 12): 42. 1903, as *Phragmopedilum*.

Paphiopedilum § *Phragmopedilum* Pfitz. in Engl. Bot. Jahrb. 25:527. 1898.

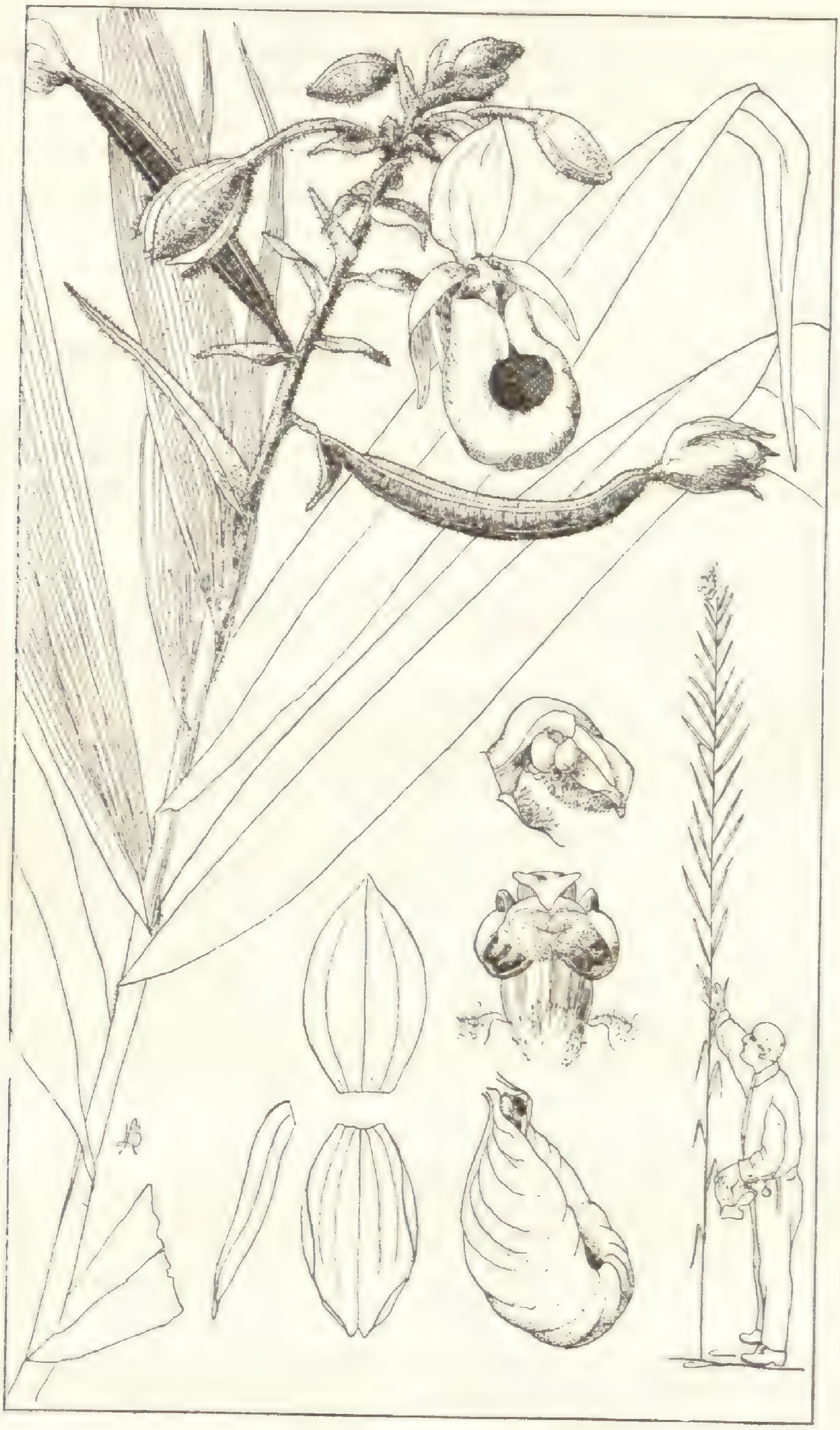


Fig. 64. *Selenipedium chica*

Terrestrial or epiphytic herbs with very short stems. Leaves duplicative, coriaceous, sulcate above and carinate below, inarticulate. Inflorescence terminal, racemose or paniculate, several-flowered; flowers medium to large-sized, resupinate. Sepals spreading, the dorsal free, the laterals connate almost to their apices. Petals narrower than the sepals but often much elongated and caudate. Lip calceiform, saccate. Column short. Fertile anthers 2, the third stamen (staminodium) sterile, stigma deflexed from the apex of the column, subparallel to the ovary or subrotund, papillose. Capsule long-fusiform, trilocular, the perianth deciduous.

Two species in Panama and about a dozen species in South America. Often in cultivation.

a. Petals mostly more than 30 cm. long when mature; leaves lorate..... 1. P. CAUDATUM
aa. Petals mostly less than 10 cm. long when mature; leaves linear or linear-ligulate..... 2. P. LONGIFOLIUM

1. PHRAGMIPEDIUM CAUDATUM (Lindl.) Rolfe in Orch. Rev. 4:332. 1896; Pfitz. in Engl. Pflanzenr. IV. 50 (Heft 12): 52. 1903, in synon; L. Wms. in Ann. Missouri Bot. Gard. 26:279. 1939.

Cypripedium caudatum Lindl. Gen. & Sp. Orch. Pl. 531. 1840.
Cypripedium Humboldti Warsz. ex Reichb. f. in Bot. Zeit. 10:691. 1852.
Cypripedium Warszewiczianum Reichb. f. loc. cit. 692. 1852.
Paphiopedilum caudatum Pfitz. in Engl. Bot. Jahrb. 19:41. 1894; Kerch. Orch. 454. 1894.
Cypripedium caudatum var. *Warscewiczii* Hort. in Kerch. loc. cit. 1894.
Cypripedium caudatum var. *roseum* Hort. in Kerch. loc. cit. 1894.
Phragmopedilum Warszewiczianum Schltr. in Fedde Rep. Sp. Nov. Beih. 17:9. 1922.

Stems very much reduced, leafy. Leaves 15–20 cm. long, 3–5 cm. broad, lorate, obtuse, apex shallowly and unequally bilobed, coriaceous, inarticulate, glabrous. Inflorescence terminal, few-flowered, exceeding the leaves; rachis velutinous; flowers large; bracts 3–6 cm. long, obtuse, subrotund, clasping the rachis. Dorsal sepal 10–15 cm. long and 1.5–2 cm. broad at the base, lanceolate, minutely pubescent dorsally. Lateral sepals together about 8–11 cm. long and 2.5–4 cm. broad, ovate-lanceolate to lanceolate, connate to their apices. Petals 30–70 cm. long when mature, 0.5–1 cm. broad at the base, long-caudate, puberulent. Lip 5–6 cm. long and about 2.5–3 cm. broad in natural position, calceiform, margins involute, lateral edges of the opening pilose. Ovary velutinous.

Panama, Venezuela (?), Colombia, Ecuador and Peru.

CHIRIQUÍ: probably Volcán de Chiriquí, *Warscewicz;* vicinity of Casita Alta, Volcán de Chiriquí, alt. 1500–2000 m., *Woodson, Allen & Seibert 962.*

The description is based on the specimens collected by Woodson, Allen and Seibert. No living material was available, and the plant is difficult to describe from dried material. The form of the species in Panama is the superior horticultural form and for this reason has been almost exterminated there. The species is difficult to grow at sea-level.

2. PHRAGMIPEDIUM LONGIFOLIUM (Warsz. & Reichb. f.) Rolfe in Orch. Rev. 4:33. 1896.

Cypripedium longifolium Warsz. & Reichb. f. in Bot. Zeit. 10:690. 1852; Hook. f. in Bot. Mag. 98: *t. 5970.* 1872.
Selenipedium longifolium Reichb. f. Xenia Orch. 1:3. 1854.
Cypripedium Hincksianum Reichb. f. in Gard. Chron. n. s. 9:202. 1878.
Paphiopedilum longifolium Pfitz. in Engl. & Prantl, Nat. Pflanzenfam. II. 6:84. 1888.
Paphiopedium longifolium Kerch. Orch. 455. 1894.
Paphiopedilum Hincksianum Pfitz. in Engl. Bot. Jahrb. 19:41. 1894.

Stems much reduced, leafy. Leaves up to 80 cm. long and 1–4 cm. broad, linear or linear-ligulate, canaliculate, acute, inconspicuously and unequally bilobed at the apex, inarticulate, distichous. Inflorescence terminal, several-flowered, glabrous; flowers medium-sized; bracts 4–9 cm. long and 1–2 cm. broad, acute, distichous, glabrous. Dorsal sepal 3–5.5 cm. long and 1–1.8 cm. broad, lanceolate or lanceolate-acuminate. Lateral sepals 2.5–5 cm. long and 1.7–2.5 cm. broad, ovate-lanceolate. Petals 5–10 cm. long and 0.4–0.8 cm. broad, linear-lanceolate, caudate, pubescent within, especially at the base. Lip 2.5–4 cm. long and about half as broad, calceiform, pubescent within, at least at the base, margins involute.

Costa Rica, Panama and Colombia.

CHIRIQUÍ: in barranca west of Caldera River, alt. 3800 feet, *Powell 308;* without locality, *Warscewicz.* COCLÉ: valley of the upper Río Mata Ahogado, alt. 350 m., *Allen 145;* Las Margaritas, *Bouché 4.* PANAMÁ: without locality, *Seemann 1114.*

3. HABENARIA Willd.

HABENARIA Willd. Sp. Pl. 4:44. 1805; Kränzl. Orch. Gen. & Sp. 1:174. 1901; Ames, Orch. 4:1–288. 1910.

Gymnadenia R. Br. in Aiton, Hort. Kew. ed. 2, 5:191. 1813.
Platanthera L. C. Rich. in Mém. Mus. Par. 4:48. 1818.
Limnorchis Rydb. in Mem. N. Y. Bot. Gard. 1:104. 1900.

Terrestrial or palustrine herbs with cauline or basal leaves or rarely the leaves reduced to bracts. Leaves thin to fleshy, usually prominent. Inflorescence few- to many-flowered, spicate or racemose; flowers various; bracts often large and conspicuous. Sepals subequal, free or connate at the bases, the dorsal erect, usually concave, the laterals usually spreading. Petals similar to the sepals but usually smaller, or more or less deeply bifid (rarely trifid or polyfid). Lip simple or 3 or more-lobed, often adnate to the column, spreading or pendulous, spurred at the base. Column short, footless. Stigmas 2 or 1 stigma 2-lobed, often elongated into short or comparatively long processes. Anther erect, rarely more or less resupinate, persistent; pollinia (or pollen) granular, with short or sometimes long caudicles from the base.

A polymorphic genus of world-wide distribution, probably one of the oldest genera in the family. There are many more generic synonyms than those cited but the ones given are the essential ones for the Panama flora. A good account of the North American species known to 1910 will be found in Ames, Orchidaceae, Vol. 4.

a. Petals entire or merely toothed; lip entire, toothed at the base or 3-lobed.
  b. Petals lanceolate..... 1. H. ALATA
  bb. Petals not lanceolate..... 3. H. PETALODES
aa. Petals bifid; lip 3-lobed.
  b. Palustrine or aquatic plants..... 8. H. REPENS
  bb. Not palustrine nor aquatic plants.
    c. Sepals less than 5 mm. long (mostly 3 mm.)..... 7. H. HEPTADACTYLA
    cc. Sepals much more than 5 mm. long.
      d. Lateral lobes of the lip very much shorter than the mid-lobe; petals short..... 4. H. AVICULA
      dd. Lateral lobes of the lip about as long as the mid-lobe or longer; petals normal.
        e. Bracts of the inflorescence large and leaf-like; flowers mostly less than 5... 6. H. PAUCIFLORA
        ee. Bracts of the inflorescence not large and leaf-like; flowers mostly more than 5.
          f. Spur 40–50 mm. long; leaves ensiform to linear-lanceolate..... 5. H. BICORNIS
          ff. Spur 15–25 mm. long; leaves elliptic-oblong to ovate-lanceolate.. 2. H. MONORRHIZA

Fig. 65. *Habenaria alata*

1. HABENARIA ALATA Hook. Exot. Fl. 3: *t. 169.* 1827; Ames, Orch. 4:273. 1910; Bot. Mus. Leafl. Harv. Univ. 3:20, *fig.* 1934.

Erect or ascending terrestrial herbs with leafy stems, 2–7 dm. tall. Leaves 6–14 cm. long and 0.8–2 cm. broad, linear-lanceolate to lanceolate, acute or acuminate, reduced to bracts below and above. Inflorescence subracemose, up to 2 dm. long, densely flowered; flowers pale green. Dorsal sepal 6–10 mm. long and 5–7 mm. broad, ovate to suborbicular, concave. Lateral sepals 7–10 mm. long and 3.5–4.5 mm. broad, lanceolate to triangular-lanceolate, acute or acuminate. Petals 5.5–10 mm. long and 2–2.5 mm. broad, lanceolate, acute or obtuse, auriculate at the base on the anterior margin. Lip 5.5–8 mm. long and about 2 mm. broad, linear-lanceolate to lanceolate, entire, auriculate or dentate on either side at the base; spur up to 13 mm. long, recurved, subclavate. Ovary prominently winged when mature.

Neotropical.

CANAL ZONE: Barro Colorado Island, *Kenoyer 249*; Ana Lago and Corozal, *Powell 316, 317, 318, 321, 3403.*

The Panamanian material is somewhat atypical.

2, HABENARIA MONORRHIZA (Sw.) Reichb. f. in Ber. Deut. Bot. Ges. 3:274. 1885.
Orchis monorrhiza Sw. Nov. Gen. & Sp. Prodr. 118. 1788.

Erect, slender, terrestrial herbs up to about 12 dm. tall. Leaves 3–13 cm. long and 1.5–4 cm. broad, elliptic-oblong to lanceolate to ovate-lanceolate, acute or acuminate, margins chartaceous, reduced to bracts upward. Inflorescence a densely flowered raceme up to about 20 cm. long; flowers white. Dorsal sepal 5–8 mm. long and 4–5.5 mm. broad, ovate or suborbicular-ovate, obtuse, cucullate. Lateral sepals 4–8 mm. long and 3–4 mm. broad, ovate, oblique, obtuse. Petals 5–8 mm. long, bipartite, the lobes subequal; anterior lobe filiform; posterior lobe elliptic or elliptic-oblong, obtuse or acutish. Lip about 7–10 mm. long, trilobate; lateral lobes filiform, spreading; mid-lobe linear-ligulate; spur 15–25 mm. long, pendulous, slender. Ovary somewhat winged.

Guatemala to Panama, the West Indies and South America.

CHIRIQUÍ: Boquete, alt. 1150 m., *Terry & Terry 1641*. COCLÉ: hills south of El Valle de Antón, alt. 600–800 m., *Allen 2771*.

3. HABENARIA PETALODES Lindl. Gen. & Sp. Orch. Pl. 316. 1835.

Habenaria petalodes var. *micrantha* Reichb. f. Beitr. Orch. Centr.-Am. 5. 1866.
Habenaria Warszewiczii Schltr. in Anex. Mem. Inst. Butantan 1^2:25. 1921.

Erect terrestrial herbs up to about 6 dm. tall. Leaves 4–17 cm. long and 1–5.5 cm. broad, lanceolate to elliptic or elliptic-oblong, acute or somewhat acuminate, crowded near the middle of the stem, reduced to bracts above. Inflorescence up to about 25 cm. long, strict, densely flowered; bracts up to 3 cm. long, lanceolate to lanceolate-ovate, acute or acuminate. Dorsal sepal 6–10 mm. long and 4–6 mm. broad, ovate to broadly ovate, obtuse, cucullate. Lateral sepals 7–10 mm. long and 3.5–5 mm. broad, semi-lunate or oblong-arcuate, obtuse. Petals 5–9 mm. long and 3.5–6.5 mm. broad, oblong to subquadrate to triangular-oblong and cuneate at the base, dilated toward the truncate, bi- or tridentate apex. Lip 7–12 mm. long and about 1 mm. broad, linear, acute or obtuse, sometimes dilated at the apex and sometimes with obscure teeth on either side at the base; spur up to 30 mm. long (mostly about 20 mm.), slender, straight.

Panama, Colombia, Brazil and Paraguay.

"PANAMA": *Warszewicz*. COCLÉ: Nata, alt. about 50 m., *Allen 820*. PANAMÁ: Taboga Island, *Killip 3173, 3190, 3191;* same locality, alt. 0–350 m., *Allen 1280*. CANAL ZONE and PANAMÁ: Chorerra, Tapia, Sieba Terra, Sosa Hill, Ancón Hill, Juan Diaz Range, *Powell 212, 260, 261, 262, 264, 265, 266, 326, 327, 328, 330, 331, 332, 336, 337, 339, 346, 3417, 3419, 3421*.

I have reported a specimen of this, in error, as *H. strictissima* var. *odontopetala* (Reichb. f.) L. Wms., in Ann. Missouri Bot. Gard. 27:271. 1940.

4. HABENARIA AVICULA Schltr. in Fedde Rep. Sp. Nov. Beih. 17:138. 1921.
Habenaria patentiloba Ames in Proc. Biol. Soc. Wash. 34:151. 1921.

Slender, erect, terrestrial herbs up to 4.5 dm. tall, with leafy stems. Leaves 7–15 cm. long and 1–3.5 cm. broad, lanceolate, elliptic to elliptic-oblong, obtuse,

acute or acuminate, reduced to bracts above and below. Inflorescence laxly to densely flowered; bracts 1–2.5 cm. long and 0.4–0.8 cm. broad, lanceolate to ovate-lanceolate, acute or acuminate. Dorsal sepal about 4–6 mm. long and as broad, suborbicular, concave. Lateral sepals 6–10 mm. long and 4–7.5 mm. broad, broadly sub-lunate, spreading. Petals 4–6 mm. long and about 3 mm. broad, bifurcate, the lobules or teeth acute, the anterior tooth shortest. Lip 12–16 mm. long and 1–2 mm. broad, linear, provided with a pair of narrow basal teeth about 1–3.5 mm. long; spur 15–30 mm. long, slightly recurved.

Endemic in Panama.

"PANAMA": *Joseph; Purdom.* PANAMÁ: Orange River Valley, *Killip 3124.* CANAL ZONE: near Fort Kobe, *Allen 2023;* hills near Summit, *Allen 2251;* foothill savannahs east of city, *Powell 162.*

5. HABENARIA BICORNIS Lindl. Gen. & Sp. Orch. Pl. 309. 1835.

Erect terrestrial herbs up to 6.5 dm. tall, with leafy stems. Leaves 5–25 cm. long and 0.5–1.5 cm. broad, ensiform to linear-lanceolate, acute or acuminate. Inflorescence a many-flowered raceme; bracts 1–3 cm. long, lanceolate, acuminate. Dorsal sepal 6–8 mm. long and 4–6 mm. broad, ovate-orbicular, cucullate, obtuse or acute, apiculate. Lateral sepals 8–10 mm. long and 4–5 mm. broad, semi-lunate, acute, apiculate. Petals bifid; posterior lobe 5–6 mm. long and 1.5–2 mm. broad, acute, arcuate; anterior lobe 6–9 mm. long and about 1 mm. broad, linear-filiform, acute, arcuate. Lip tripartite; the mid-lobe 7–10 mm. long and 1–2 mm. broad; lateral lobes 9–12 mm. long and 1–1.5 mm. broad, arcuate-spreading, acute; spur 40–50 mm. long, slender, subclavate.

Panama, the West Indies.

PANAMÁ: near Pacora, *Powell 315.* CANAL ZONE: Las Sabanas, *Pittier 6792.*

6. HABENARIA PAUCIFLORA (Lindl.) Reichb. f. in Bonplandia 2:10. 1854; L. Wms. in Ann. Missouri Bot. Gard. 26:280. 1939.

Bonatea pauciflora Lindl. Gen. & Sp. Orch. Pl. 329. 1835.
Habenaria setifera Lindl. in Ann. Nat. Hist. 4:381. 1840; Ames, Orch. 4:209, *t. 69.* 1910; in Bot. Mus. Leafl. Harv. Univ. 3:35, *fig. 1, p. 23.* 1934.
Habenaria spathacea Rich. & Gal. in Ann. Sci. Nat. III, 3:29. 1845.

Erect terrestrial herbs up to 5.5 dm. tall. Leaves 4–12 cm. long and 0.3–1.8 cm. broad, linear-lanceolate to elliptic-lanceolate, acute or acuminate, sometimes much reduced, usually partly sheathing the stem, reduced to bracts above. Inflorescence few-flowered (rarely more than 5-flowered); bracts similar to the leaves but smaller. Dorsal sepal 9–12 mm. long and 5–8 mm. broad, ovate-lanceolate to ovate, apiculate, cucullate. Lateral sepals 8–12 mm. long and 3.5–5 mm. broad, triangular-lanceolate, subfalcate, acute, acuminate or apiculate. Petals bipartite; anterior lobe 6–10 mm. long and up to 1 mm. broad, subfiliform, somewhat arcuate; posterior lobe 8–10 mm. long and 3–4 mm. broad, lanceolate or elliptic-lanceolate, acute, somewhat arcuate. Lip tripartite; the lateral lobes divergent and subequal to the mid-lobe in length; mid-lobe 10–14 mm. long and up to 2 mm. broad; spur 2.5–6 cm. long, subclavellate.

Fig. 66. *Habenaria repens*

Mexico to Argentina.

CHIRIQUÍ: Llanos del Volcán, *Seibert 326*. PANAMÁ: Campana to Chica, *Allen 2653*; Pacora to Chepo, *Woodson, Allen & Seibert 1665*.

An extremely variable species which has twenty or more synonyms.

7. HABENARIA HEPTADACTYLA Reichb. f. in Linnaea 22:812. 1849.

Slender, erect, terrestrial herbs up to 3.5 dm. tall. Leaves up to 7 cm. long, linear-filiform, aristate, reduced to bracts above. Inflorescence short, several-flowered, more or less secund; bracts up to 1.5 cm. long, ovate-lanceolate, long-acuminate; flowers small for the genus. Dorsal sepal 3–3.5 mm. long and 2–2.5 mm. broad, ovate, obtuse, cochleate, 3-nerved. Lateral sepals 3.5–4 mm. long and 1.2–1.5 mm. broad, lanceolate, acute, 3-nerved. Petals 2.5–3 mm. long, bipartite; the segments subequal or the outer shorter, lanceolate, acute, somewhat arcuate. Lip 3-lobed; the mid-lobe linear, 3–4.5 mm. long and about 0.5 mm. broad, linear, obtuse; lateral lobes 2.5–3.5 mm. long and 0.4–0.6 mm. broad, linear, obtuse, spreading; spur 10–12 mm. long, recurved, slightly saccate at the tip.

Panama, Colombia, Venezuela, British Guiana and Brazil.

WITHOUT LOCALITY: *Bouché 7*. PANAMÁ: near Arraiján, alt. about 15 m., *Woodson, Allen & Seibert 1406*.

8. HABENARIA REPENS Nutt. Gen. N. Am. Pl. 2:190. 1818; Ames, Orch. 4:216. 1910; in Bot. Mus. Leafl. Harv. Univ. 3:35, *fig. p. 23*. 1924.

Erect, slender, palustrine or aquatic herbs up to about 1 m. tall. Leaves up to 20 cm. long and 0.5–2.3 cm. broad, linear-elliptic to elliptic-lanceolate, acute or acuminate, reduced to bracts upward. Inflorescence a densely flowered raceme; flowers green. Dorsal sepals 4–7.5 mm. long and 3–5 mm. broad, oval to sub-orbicular-ovate, cochleate, apiculate. Lateral sepals 4–8 mm. long and 2–3 mm. broad, ovate to lanceolate-oval, oblique, apiculate. Petals 4–9 mm. long, bipartite, the lobes subequal; anterior lobe filiform; posterior lobe 1–2 mm. broad, linear-lanceolate to lanceolate, arcuate. Lip 5–10 mm. long and 1–2.5 mm. broad across the base, trilobate, the lobes subparallel; lateral lobes filiform; mid-lobe linear-lanceolate, usually a little shorter than the laterals; spur 8–15 mm. long, slender.

Southeastern United States, Guatemala, British Honduras, Nicaragua, Costa Rica, Panama, the West Indies and South America.

CANAL ZONE: Barro Colorado Island, *Bailey & Bailey 663; Dodge 3483; Woodworth & Vestal 55A, 65A*.

Often found in floating debris and in very wet places. The illustration, fig. 66, is redrawn from Ames, Orch. 1:51, *t. 16*. 1905.

4. POGONIA Juss.

POGONIA Juss. Gen. 65. 1789.

Triphora Nutt. Gen. N. Am. Pl. 2:192. 1818.
Cleistes L. C. Rich. in Mém. Mus. Par. 4:31. 1818.

Rhizome or tuber-bearing, leafy or leafless terrestrial herbs. Sepals subequal, free, erect or rarely spreading. Petals similar to the sepals or shorter and broader, usually erect. Lip erect, simple or 3-lobed, sessile or unguiculate, plane or with various lamellate or thickened nerves, spurless. Column elongated, wingless, footless; stigma oblong or broader; clinandrium more or less raised, entire or denticulate; anther subincumbent or apparently erect, substipitate (at least in some species); pollinia 2 masses, granular.

Ames (Orch. 7:7. 1922), in his account of this group of allied genera, separates *Cleistes (Pogonia rosea)* from *Pogonia* (typified by *P. ophioglossoides*) on the basis of simple pollen grains for *Pogonia* and compound pollen grains for *Cleistes*. However the so-called *Cleistes* seem to have simple pollen grains as often as not. The case for maintaining *Triphora* as a distinct genus is much better and is based on better characters. It is a matter of choice whether or not it is maintained.

a. Lip with two stipitate processes at the base; lamina simple..... 1. P. ROSEA
aa. Lip without stipitate processes at the base; lamina 3-lobed.
  b. Apex of the lip, at least, verrucose..... 4. P. CUBENSIS
  bb. Apex of the lip, nor any part, verrucose.
    c. Cauline leaves well developed..... 2. P. MEXICANA
    cc. Cauline leaves none or very much reduced..... 3. P. WAGNERI

1. POGONIA ROSEA (Lindl.) Hemsl. in Godm. & Salvin, Biol. Centr.-Am. Bot. 3:304. 1884.

Cleistes rosea Lindl. Gen. & Sp. Orch. Pl. 410. 1840.

Tall, slender, erect, terrestrial herbs up to 1.5 m. tall (Panamanian material up to 0.7 m. tall). Leaves 3–12 cm. long, 0.8–2.5 cm. broad, lanceolate, obtuse or acute, sessile and clasping the stem, apparently rather thick when fresh. Inflorescence of 1 or 2 rather large and showy flowers in the axils of the upper leaves. Dorsal sepal 5–6.5 cm. long and 0.6–0.8 cm. broad, linear-elliptic to lanceolate-elliptic, acute. Lateral sepals 5.5–6.5 cm. long and 0.8–1.1 cm. broad, linear-lanceolate to lanceolate, acute. Petals 5–6.5 cm. long and 1–1.6 cm. broad, elliptic to elliptic-oval, acuminate. Lip 4.5–5.5 cm. long and 1.6–3 cm. broad, broadly oblanceolate to narrowly obovate, obtuse, the median line of the lip callus-thickened or lamellate, lacerate toward the apex, with two stipitate processes at the base.

Panama, Colombia, Venezuela, British Guiana, possibly also in Costa Rica, and doubtless in other of the South American countries,—the "West Indies" according to Hemsley.

COCLÉ: *Seibert 594.* CANAL ZONE: *Powell 113, 3395, 3400.* "Panama," *Duchassaing.*

Fig. 67. *Pogonia roseo*

Mr. Powell reported a white-flowered form of the species.

2. POGONIA MEXICANA S. Wats. in Proc. Am. Acad. 26:154. 1891.

Triphora mexicana Schltr. in Fedde Rep. Spec. Nov. Beih. 17:139. 1921; Ames, Orch. 7:40, *t. 109, f. 5–6.* 1922.

Weak terrestrial herbs up to 27 cm. tall, with leaf-bearing stems. Leaves 8–20 mm. long and 5–17 mm. broad, narrowly to broadly ovate, obtuse or acute. Inflorescence of 1–3 single flowers borne in the axils of the upper leaves (or leaf-like bracts?). Dorsal sepals 10–17 mm. long and about 2 mm. broad, linear to linear-oblanceolate, obtuse or acute. Lateral sepals 10–17 mm. long and 1.5–3 mm. broad, linear to narrowly elliptic, subfalcate, acute. Petals 9–17 mm. long and 1–3 mm. broad, linear to linear-elliptic, subfalcate, acute or obtuse. Lip 10–16 mm. long and 5–9 mm. broad, narrowly oval to obovate in outline, conspicuously narrowed to the base, 3-lobed; lateral lobes obtuse, subtriangular, terminal lobe suborbicular to deltoid; disc trilamellate.

Mexico, Guatemala and Panama.

CANAL ZONE: *Bevins.*

Very close if not the same as *Pogonia trianthophora* (Sw.) BSP.

3. POGONIA **Wagneri** (Schltr.) L. Wms., comb. nov.

Triphora Wagneri Schltr. in Fedde Rep. Sp. Nov. 17:139. 1921.

Small, leafless, erect, terrestrial herbs up to 7.5 cm. tall. Inflorescence 1-flowered, the flower erect. Dorsal sepal about 12 mm. long, ligulate, obtuse. Lateral sepals about 12 mm. long, ligulate, obtuse, falcate. Petals a little shorter and a little broader than the dorsal sepal, ligulate, obtuse, subfalcate-oblique. Lip about 10 mm. long and 5 mm. broad, narrowly obovate-cuneate in outline, prominently 3-lobed near the apex; lateral lobes obliquely ovate, obtuse; mid-lobe semi-ovate, obtuse, somewhat undulate; disc with 3 thickened, subverrucose nerves toward the apex.

Known only from Panama.

CHIRIQUÍ and VERAGUAS: *Wagner 1778.*

The description is taken from the original and a manuscript analysis.

4. POGONIA CUBENSIS Reichb. f. in Nederl. Kruidk. Arch. 4:322. 1850, as *P. rubensis* by error.

Triphora cubensis Ames, Sched. Orch. 7:35. 1924.

Small terrestrial herbs up to 15 cm. tall. Leaves few, reduced to sheathing bracts, often much reduced above, 0.8–2 cm. long and 0.4–1 cm. broad, lanceolate to suborbicular. Inflorescence several-flowered, the pedicels of the lower flowers often elongated and hence the raceme often appearing subcorymbose. Dorsal sepal 7–8 mm. long and 1–1.5 mm. broad, linear to linear-lanceolate, obtuse. Lateral sepals similar to the dorsal sepal except more or less arcuate. Petals 7–7.5

mm. long and 1–1.2 mm. broad, narrowly elliptic to narrowly elliptic-oblanceolate, acute or obtuse. Lip 7–8 mm. long and about 3 mm. broad, lanceolate-obovate, unguiculate, 3-lobed, mid-nerve more or less lamellate and often dentate; mid-lobe subrotund; lateral lobes usually short, lanceolate to lanceolate-ovate.

Florida, Mexico, Panama and Cuba.

CANAL ZONE: Barro Colorado Island, *Kenoyer 250.*

This species has the appearance of a saprophyte but probably is not. It has been collected but once in Panama.

5. VANILLA Sw.

VANILLA Sw. in Nova Acta Soc. Sci. Upsal. 6:66. 1799; Rolfe in Jour. Linn. Soc. Bot. 32:439–478. 1896.

Usually epiphytic, scandent, leafy (in Panama) or leafless herbs, often with branched stems. Leaves coriaceous or fleshy, sessile or short-petiolate. Inflorescence a (short) raceme from the axils of the leaves. Sepals subequal, spreading, free. Petals similar to the sepals. Lip with its claw adnate to the column, often enfolding the column. Column elongated, footless, wingless; anther incumbent (rarely appearing erect); pollinia granular. Capsule ("bean") elongated, fleshy, often fragrant.

The only truly commercial members of the Orchidaceae belong to the genus *Vanilla.* The extract of the Vanilla "bean" was perhaps the first flavoring used by the American Indians. Natural Vanilla flavoring is now largely displaced by the synthetic.

The taxonomy of *Vanilla* is most difficult because of the fugaceous flowers.

a. Lip with verrucose lines or papillae..... 1. V. PLANIFOLIA
aa. Lip without verrucose lines or papillae..... 2. V. POMPONA

1. VANILLA PLANIFOLIA Andr. Bot. Repos. 8: *t. 538.* 1808; Dillon in Am. Orch. Soc. Bull. 10:339, *t. II.* 1942.

Vanilla fragrans of authors.

Scandent branched leafy herbs. Leaves 8–23 cm. long and 2–8 cm. broad, narrowly lanceolate to elliptic-oblong, acute or acuminate, fleshy. Raceme short, 5–7 cm. long, axillary; bracts 5–10 mm. long, oblong, obtuse or subacute. Sepals 4–7 cm. long and 1–1.5 cm. broad, linear to oblanceolate, obtuse or acute. Petals similar to the sepals but smaller. Lip 4–5 cm. long and 1.5–3 cm. broad, with longitudinal, verrucose lines or papillae and a tuft of pubescence on the disc. Column about 3 cm. long, pubescent dorsally. Capsule ("bean") up to about 20 cm. long and 1 cm. in diameter.

Mexico to Panama, probably also in the West Indies. Cultivated throughout the tropics of the world.

SAN BLAS: Perme, *Cooper 287.* CANAL ZONE: Fort Clayton and Corozal, *Standley 29103.* PANAMÁ: Río Tecúmen, *Standley 29353;* near Panamá, *Standley 29731.*

Fig. 68. *Vanilla planifolia*

We think that *Vanilla rubra* (Lam.) Urban will probably prove to be the correct name for this species.

This is the most commonly cultivated of the Vanillas. There are apparently several forms of the species and considerable difference in the flavor of the Vanilla extract in the various forms.

2. VANILLA POMPONA Scheide in Linnaea 4:573. 1829; Ames, Sched. Orch. 9:6. 1925.

Vanilla Pompona Lindl. Gen. & Sp. Orch. Pl. 437. 1840.
Vanilla Pittieri Schltr. in Fedde Rep. Sp. Nov. 3:106. 1906.

Scandent, branched, leafy herbs. Leaves 10–30 cm. long and 3.5–9 cm. broad, variable in shape, narrowly elliptic-oblong or elliptic-lanceolate to lanceolate-ovate, rarely obovate-lanceolate, often oblique, acute or obtuse, coriaceous. Inflorescence up to about 16 cm. long, several-flowered, axillary; bracts about 1 cm. long, lanceolate to ovate, obtuse or acute, cucullate. Sepals 7–8.5 cm. long, linear-elliptic to narrowly oblanceolate, obtuse or acute. Petals similar to the sepals or a little smaller. Lip 7–8.5 cm. long and 2.5–4 cm. broad, obovate-lanceolate to obovate, unguiculate, crenulate at least toward the apex, with a tuft of hair in the center of the disc. Column up to about 6 cm. long. Capsule ("bean") about 15 cm. long, fusiform.

Mexico to Panama, the West Indies, Venezuela, Ecuador, Bolivia, British and Dutch Guiana; possibly as a cultigen in some of these countries and possibly elsewhere.

CANAL ZONE: *Hunter & Allen 852; Maxon 6779; Powell 127, 412, 3507; Piper.*

Vanilla Pompona is cultivated in some places. It is probably inferior to *V. planifolia* for making extract of Vanilla.

6. ELLEANTHUS Presl

ELLEANTHUS Presl, Rel. Haenk. 1:97. 1827; Benth. & Hook. Gen. Pl. 3:522. 1883.

Evelyna Poepp. & Endl. Nov. Gen. & Sp. Pl. 1:32. 1835.

Terrestrial or epiphytic herbs ordinarily with strongly nerved, plicate, cauline leaves. Sepals subequal, free or the laterals somewhat connate at the base and forming a mentum. Petals subequal to the sepals, usually narrower. Lip adnate to the base of the column and usually enfolding it, subequal to or exceeding the sepals, usually gibbous-concave at the base and constricted above the base, the basal cavity containing two large, usually subovoid calluses. Column erect, footless; anther operculate, more or less incumbent or erect, bilocular; pollinia 8, subceraceous.

A rather natural genus which is highly developed in the Andes.

a. Inflorescence distichous.
b. Stems fasciculately branched..... 4. E. AURANTIACUS
bb. Stems not fasciculately branched.

c. Leaves 1.5 cm. or less long, oblong-lanceolate or broader, persistent..... 7. E. MUSCICOLA
cc. Leaves 1.5 cm. or more long, elliptic-lanceolate or narrower, deciduous.
d. Bracts of the inflorescence imbricated; leaves subfiliform to linear..... 6. E. LINIFOLIUS
dd. Bracts of the inflorescence not imbricated; leaves elliptic-lanceolate..... 5. E. LAXUS
aa. Inflorescence not distichous.
b. Stems fasciculately branched..... 4. E. AURANTIACUS
bb. Stems not fasciculately branched.
c. Inflorescence capitate or subcapitate..... 1. E. CAPITATUS
cc. Inflorescence spicate or racemose.
d. Lip trilobulate..... 3. E. TRILOBATUS
dd. Lip not trilobulate..... 2. E. HYMENOPHORUS

1. ELLEANTHUS CAPITATUS (P. & E.) Reichb. f. in Walp. Ann. 6:475. 1862.

Evelyna capitata Poepp. & Endl. Nov. Gen. & Sp. Pl. 1:32. 1835.
Bletia capitata R. Br. in Ait. Hort. Kew. ed. 2, 5:206. 1813, *but not basis of Elleanthus capitatus.*

Epiphytic or terrestrial, reed-like herbs up to about 12 dm. tall. Stems slender, erect, covered with leaf-sheaths or naked below. Leaves 5–25 cm. long (mostly 15–20 cm.) and 1–5.5 cm. broad, linear-lanceolate to ovate-lanceolate, acuminate, plicate, reduced upward and becoming bract-like. Inflorescence a dense, many-flowered, capitate or subcapitate raceme; outer bracts sterile, triangular-ovate, acuminate, up to about 4 cm. long, inner bracts fertile, ovate-lanceolate, acute or acuminate, shorter than the outer bracts; flowers covered with a glutinous material. Dorsal sepal 8–12 mm. long and 2.5–4 mm. broad, oblong-lanceolate, acute, slightly cucullate. Lateral sepals 8–12 mm. long and 3–4 mm. broad, elliptic-oblong, acute, somewhat oblique. Petals 11–12 mm. long and 1–2 mm. broad, linear, obtuse or acute. Lip 8–13 mm. long and 8–11 mm. broad, oval to suborbicular-flabellate, anterior margins more or less lacerate-dentate, base gibbous and with two approximate, subglobose calluses; disc thickened in the middle.

Mexico to Panama, the West Indies and in South America to Peru.

CHIRIQUÍ: Monte Lirio, alt. 1300–1900 m., *Seibert 140, 268.*

A distinctive and widespread species. The name is based on *Evelyna capitata* Poepp. & Endl., and not on *Bletia capitata* R. Br., although the two names apparently represent the same species.

2. ELLEANTHUS HYMENOPHORUS Reichb. f. in Walp. Ann. 6:480. 1862.

Evelyna hymenophora Reichb. f. in Bot. Zeit. 10:710. 1852.

Caespitose, epiphytic herbs up to about 6.5 dm. tall (usually much less). Stems slender, covered with leaf-sheaths. Leaves 4–17 cm. long and 1.8–8 cm. broad, elliptic, elliptic-ovate, ovate or oval, acuminate, pergameneous. Inflorescence a compact many-flowered spike up to about 9 cm. long; bracts up to about 1.5 cm. long, lanceolate-ovate or ovate, acuminate. Dorsal sepal 5.5–7 mm. long and about 2.5 mm. broad, lanceolate to oval, acute. Lateral sepals 5–7 mm. long and 2–3 mm. broad, lanceolate to oblong-lanceolate, acute, strongly keeled dorsally.

Petals 3.5–7 mm. long and 1–1.5 mm. broad, linear-spatulate to spatulate, obtuse or acutish, more or less crenulate above. Lip 7–9 mm. long and 6.5–9 mm. broad, broadly ovate to orbicular, lacerate-dentate, the gibbous-saccate base enclosing 2 ovoid calluses and the sac with a bidentate lamellate callus in front.

Costa Rica, Panama, Colombia and Peru.

CHIRIQUÍ: "Chiriquí," *Warscewicz.* COCLÉ: summit of Valle Chiquita, alt. 1360 m., *Bouché 3X;* hills north of El Valle de Antón, alt. 1000 m., *Allen 2172;* near Cerro Turega, alt. 650–700 m., *Woodson & Schery 168.* PANAMÁ: hills above Campana, alt. 600–800 m., *Allen 1883.*

3. ELLEANTHUS TRILOBATUS Ames & Schweinf. Sched. Orch. 8:53. 1925.

Slender epiphytic herbs up to about 8 dm. tall. Leaves 5–18 cm. long and 0.5–2.5 cm. broad, linear-lanceolate to lanceolate, acuminate, plicate, apex trilobulate, reduced upwards, basal part of the stem in mature plants naked. Inflorescence up to 8 cm. long, many-flowered; bracts up to 2.5 cm. long, ovate-lanceolate to ovate, acuminate, cucullate, chartaceous, reduced upward. Sepals more or less pubescent dorsally. Dorsal sepal 6–8 mm. long and 2–3.5 mm. broad, oblong-lanceolate to narrowly ovate-lanceolate, acute, apiculate. Lateral sepals 6–8 mm. long and 2.5–3 mm. broad, ovate-lanceolate to oblong-lanceolate, somewhat oblique, acute, cucullate. Petals 5–7 mm. long and 1–1.5 mm. broad, linear-oblong, obtuse. Lip trilobulate, 6–7.5 mm. broad, obovate-orbicular, flabellate, fimbriate-lacerate on the terminal half, base gibbous-saccate and with 2 oval calluses, disc with 2 transverse, sublamellate calluses about opposite each sinus. Ovary puberulent.

Costa Rica, Panama and Colombia.

COLÓN: near Porto Bello, *Maxon 5808.* PANAMÁ: vicinity of Campana, alt. about 1000 m., *Allen 2405;* hills east of [Panama] City or San Juan, *Powell 97, 3266, 3267, 3268, 3273, 3529.* CANAL ZONE: Barro Colorado Island, *Shattuck 201.*

The Powell specimens, regardless of numbers, are probably all from one collection. Schlechter has determined *Maxon 5808* and *Powell 97* as his *Elleanthus Brenesii* and says of the latter collection (Fedde, Rep. Sp. Nov. Beih. 17:13. 1922): "Die Pflanze stimmt recht gut mit meinem Originalexemplar aus Costa Rica überein." The description and analysis of *E. Brenesii* are not entirely satisfactory but when the type can be studied *E. trilobatus* will probably prove to be a synonym.

4. ELLEANTHUS AURANTIACUS (Lindl.) Reichb. f. in Walp. Ann. 6:482. 1863.

Evelyna aurantiaca Lindl. in Benth. Pl. Hartw. 149. 1844.
Elleanthus Tonduzii Schltr. in Fedde Rep. Sp. Nov. 8:567. 1910.

Erect or ascending, branched or usually fasciculately branched herbs up to about 1 m. or more tall. Stems slender, covered with sheaths but becoming naked below, the lateral stems usually smaller than the main stem. Leaves 2–12 cm. long and 0.2–1.4 cm. broad, linear-lanceolate to lanceolate, acuminate, apex 2–3-lobulate and short-aristate, plicate. Inflorescence up to about 4 cm. long, bilateral;

Fig. 69. *Elleanthus trilobatus*

bracts up to about 1.5 cm. long, ovate-lanceolate or ovate, acuminate, cucullate, scarious; rachis somewhat fractiflex. Sepals often puberulous dorsally. Dorsal sepal 4.5–7 mm. long and 2–3.5 mm. broad, lanceolate to ovate-lanceolate, acute, cucullate. Lateral sepals 6–8 mm. long and 3–4 mm. broad, lanceolate to lanceolate-triangular, acute, somewhat arcuate. Petals 5–8 mm. long and 2–2.5 mm. broad, linear-oblong or oblanceolate, obtuse or acute, often somewhat undulate. Lip 7–10 mm. long and 7–9 mm. broad, obovate-flabellate to suborbicular, lacerate-dentate at least toward the apex, saccate-gibbous at the base and with 2 approximate calluses.

Costa Rica, Panama, and in South America to Peru.

CHIRIQUÍ: Bajo Chorro, alt. 2100 m., *Davidson 123*. PANAMÁ: hills above Campana, July 1, 1939, *Allen 1884*.

Elleanthus aurantiacus is a widespread species with a distinctive mode of branching. The description is based on the Central American material and typical material from South America. Some specimens from South America are much more robust and have larger leaves than typical.

5. ELLEANTHUS LAXUS Schltr. in Fedde Rep. Sp. Nov. 12:213. 1913; in Fedde Rep. Sp. Nov. Beih. 59: *t. 4, fig. 16*. 1931.

Slender erect caespitose herbs up to about 4 dm. tall. Leaves 4–12 cm. long and 0.4–1.2 cm. broad, elliptic-lanceolate, acuminate, 2–3-dentate at the apex, plicate, mostly near the summit of the stems. Inflorescence up to 5 cm. long, few–several-flowered, distichous, strongly fractiflex; bracts up to 4.5 cm. long, reduced upward, lanceolate to ovate-lanceolate, acuminate, chartaceous, strongly cucullate, longer than the flowers. Sepals ligulate, acuminate, 7 mm. long, the laterals oblique. Petals oblique, linear, subacute, about equal to the sepals. Lip concave-subcucullate at the base, dilated above and deeply emarginate, the margins crenate-incised and undulate, 6 mm. long and 4 mm. broad above the middle, base with 2 oblong calluses, the disc with a few papillae.

Costa Rica (?) and Panama.

DARIÉN: Sambú Basin, alt. 500–974 m., *Pittier 5640*.

The description of the flowers is taken from the original publication. No flowers from typical material have been seen but there is an analysis (by Schlechter) in the Ames Herbarium. If the analysis is correct the Costa Rican material, of which flowers are available, belongs to a different species. The Costa Rican material called *E. laxus* has a lip which is essentially oblong, emarginate, lacks surface papillae of any sort (certainly lacks the tooth-like "papillae" of Schlechter's analysis and the figure cited); the petals are differently shaped as are the lateral sepals.

6. ELLEANTHUS LINIFOLIUS Presl, Rel. Haenk. 1:97. 1827.
Isochilus linifolium Lindl. Gen. & Sp. Orch. Pl. 113. 1831.

Densely caespitose epiphytic herbs up to about 3.5 dm. tall, but mostly up to

about 1.5 dm. tall in Panama. Stems slender, covered with the leaf-sheaths or partially naked. Leaves 1.5–9 cm. long and 0.1–0.4 cm. broad, subfiliform to linear, acute, obtuse or denticulate at the apex. Inflorescence up to 2.5 cm. long, a short, distichous, obscurely fractiflex raceme; bracts up to about 1.5 cm. long, lanceolate or ovate-lanceolate, acute or acuminate, cucullate, scarious, imbricated. Sepals glabrous or sparsely brown-pubescent dorsally. Dorsal sepal about 3 mm. long and 1 mm. broad, elliptic-lanceolate, cucullate. Lateral sepals 3–3.5 mm. long and 1.2–1.5 mm. broad, ovate-lanceolate, short-acuminate, somewhat arcuate. Petals about 3 mm. long and 1–1.2 mm. broad, linear-oblong to oblong-spatulate, obtuse, truncate, obscurely crenulate, arcuate. Lip about 3–3.5 mm. long and 4–5 mm. broad, subquadrate-flabellate to flabellate, truncate, denticulate, gibbous at the base and with 2 lightly attached ovoid calluses, with a short transverse callus above the base.

Mexico, British Honduras, Guatemala, Costa Rica, Panama, the West Indies and south to Peru.

COLÓN: Cativa-Porto Bello trail, *Powell 353*. COCLÉ: El Valle de Antón, alt. 600 m., *Allen 2075;* hills north of El Valle de Antón, alt. 1000 m., *Allen 2869*. CANAL ZONE: Gatún Lake, *Purdom*.

7. ELLEANTHUS MUSCICOLA Schltr. in Fedde Rep. Sp. Nov. Beih. 19:10. 1923.

Small caespitose epiphytic herbs up to about 12 cm. tall. Stems slender, covered with leaf-sheaths. Leaves 10–15 mm. long and 2.5–5 mm. broad, oblong-lanceolate to oblong-ovate, obtuse, coriaceous, persistent, distichous. Inflorescence up to about 1.7 cm. long, a short distichous, obscurely fractiflex raceme; bracts up to about 1 cm. long, lanceolate-ovate or ovate, compressed, cucullate, scarious, sphacelate, imbricated. Sepals substellate-furfuraceous dorsally; dorsal sepal about 3 mm. long and 1 mm. broad, elliptic, acute, cucullate; lateral sepals about 3 mm. long and 1.5 mm. broad, ovate-lanceolate, acuminate, cucullate. Petals about 3.5 mm. long and 1.5 mm. broad, oblanceolate-subflabellate, obtuse, crenulate-undulate above. Lip about 3–3.5 mm. long and 3.5–4 mm. broad, flabellate-triangular, truncate and denticulate.

Costa Rica and Panama.

COCLÉ: hills north of El Valle de Antón, alt. 1000 m., *Allen 2159*.

Elleanthus muscicola is unusual in the genus because of the habit and small persistent leaves.

7. SOBRALIA Ruiz & Pavon

SOBRALIA Ruiz & Pavon, Fl. Peruv. & Chil. Prodr. 120, *t. 26*. 1794.

Fregea Reichb. f. in Bot. Zeit. 10:712. 1852.
Lindsayella Ames & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 5:33. 1935.

Large or small, reed-like, terrestrial or epiphytic herbs. Leaves pergameneous, plicate-veined, sessile, usually few. Inflorescence a terminal raceme or often reduced to 1 flower; flowers fugaceous in Panamanian species. Sepals equal or nearly so, erect or somewhat spreading, connate at their bases. Petals similar to the sepals

but usually broader. Lip erect, from the base of the column, usually covering or enfolding the column, simple, retuse or 3-lobed, usually concave, a little longer than the sepals and petals, often undulate or fimbriate; the disc smooth, lamellate or lamellate-cristate, usually with inconspicuous or conspicuous callus thickenings at the base. Column elongated, semi-terete, more or less arcuate, with narrow wings (auricles) or acute angles at the apex, footless; anther incumbent; pollinia 8, granular or subceraceous.

A small tropical American genus, possibly with its center of distribution in Panama. Difficult to work because of the fugaceous flowers.

Fregea, a genus described by Reichenbach, has been maintained as distinct but has no characters which will separate it from *Sobralia*.—The original specimen was collected in Chiriquí.

Lindsayella, a genus based on specimens from Panama, seems to have no characters of generic value. The main segregation character is the callus at the base of the lip. Rather than a generic character these calluses seem to be the culmination of a tendency within the genus *Sobralia*.

Our knowledge of this genus in Panama is entirely inadequate. A large number of the species presumed to grow there were described by Reichenbach from material collected by Warscewicz, and of many of them nothing further is known. Paul H. Allen, long a resident of Panama and the keenest collector of orchids who has been in the country, is inclined to believe that many of the Warscewicz Sobralias which were ascribed to Panama were actually collected elsewhere. Mr. Allen writes that when Sobralias are present in the Panama flora they are apt to be quite abundant; yet he has not been able to discover many of the species that Warscewicz is said to have collected in Chiriquí Province although he has collected the same area many times.

We have not been able to make a satisfactory key to this genus because many of the species are practically unknown and require more study, as a whole, than is possible now.

1. SOBRALIA ALLENII L. Wms. in Ann. Missouri Bot. Gard. 29:336, *pl. 30, figs. 1–3*. 1942.

Caespitose, epiphytic plants up to about 5 dm. tall. Stems about 1–2 mm. in diameter, slender, bearing 1–3 leaves toward the apex, leafless below or the leaves reduced to sheaths. Leaves 13–18.5 cm. long and 1.8–2.5 cm. broad, elliptic-lanceolate to narrowly elliptic, acuminate, plicate, with seven principal nerves, lepidote on the lower surface especially along the nerves at the base, glabrous above or essentially so; leaf-sheaths closely appressed to the stem, lepidote. Inflorescence terminal, 1-flowered; flowers small, white with a pale yellow lip. Dorsal sepal about 3.5 cm. long and 7 mm. broad, oblanceolate, apiculate, 7-nerved. Lateral sepals about 3.5 cm. long and 7 mm. broad, linear-oblong, apiculate, 7-nerved. Petals about 3.5 cm. long and 6–7 mm. broad, oblanceolate, acute, terminal half serrulate, 7-nerved. Lip about 3.5 cm. long and 1.8 cm. broad, oblong-oval, truncate or shallowly retuse, terminal half lacerate-dentate; disc with several

Fig. 70. *Sobralia Allenii*

inconspicuous longitudinal carinae and with a small bipartite callus thickening at the base, pubescent longitudinally along the middle, especially toward the apex.

Panama.

COCLÉ: hills north of El Valle de Antón, alt. 1000 m., *Allen 2686.*

2. SOBRALIA **amabilis** (Reichb. f.) L. Wms., comb. nov.

Fregea amabilis Reichb. f. in Bot. Zeit. 10:712. 1852; Beitr. Orch. Centr.-Am. 10, *t. 2.* 1866.

Epiphytic or terrestrial herbs up to 6 dm. tall. Leaves 3–10.5 cm. long and 1–3.5 cm. broad, elliptic to broadly lanceolate-elliptic, acuminate; leaf-sheaths prominently verrucose. Inflorescence a single terminal flower; flower small for the genus, purple. Sepals 23–27 mm. long and 7–8 mm. broad, elliptic to elliptic-oblanceolate, acute, apiculate. Petals 20–25 mm. long and 8–10 mm. broad, broadly elliptic to elliptic-obovate, obtuse or acute. Lip 30–35 mm. long and 20–25 mm. broad, quadrate-obovate, emarginate, somewhat narrowed at the base and enfolding the column; column 10–15 mm. long.

Costa Rica and Panama.

CHIRIQUÍ: An einer nassen und kalten Stelle, Cordilleren von Chiriquí, *Warscewicz.*

The original species of the genus *Fregea*, which we do not consider distinct from *Sobralia.*

3. SOBRALIA BLETIAE Reichb. f. in Bot. Zeit. 10:713. 1852.

Plants of unknown but probably large size. Leaves 10–17 cm. long and 3–4.5 cm. broad, elliptic to broadly lanceolate, acute. Lip about 4 cm. long and about 2 cm. broad, cuneate or narrowly obovate in outline, 3-lobed; lateral lobes lanceolate-triangular, falcate; mid-lobe obovate-orbicular, emarginate, slightly exceeding the lateral lobes; disc with five crisped lamellae.

Panama.

CHIRIQUÍ: *Warscewicz.*

We have seen no material of this species. The description is taken from the original and from a photograph of the very poor type specimen.

4. SOBRALIA BOUCHEI Ames & Schweinf., Sched. Orch. 10:4. 1930.

Slender terrestrial or epiphytic herbs up to 7.5 dm. tall. Stems about 3–4 mm. in diameter. Leaves 8–17 cm. long and 3–4.5 mm. broad, elliptic or broadly elliptic-lanceolate, acute, marginate. Sepals 5.5–6.5 cm. long and 1.5–1.7 cm. broad, elliptic to lanceolate, the laterals somewhat arcuate. Petals about 6 cm. long and 2.2 cm. broad, elliptic-oblanceolate, acute, somewhat oblique. Lip about 5.5 cm. long and 5 cm. broad, obovate-orbicular, trilobulate, margins crenulate-dentate anteriorally; mid-lobe small, suborbicular; disc with 7 longitudinal, crispate carinae. Column about 2.5 cm. long.

Panama.

COCLÉ: El Valle de Antón, alt. about 1000 m., *Allen 2454.* "PANAMÁ": *Bouché s. n.*

Probably the original came from Coclé or Chiriquí. It is very closely allied to S. *Bletiae* Reichb. f.

5. SOBRALIA **callosa** L. Wms., nom. nov.

Lindsayella amabilis Ames & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 5:33. 1937, non *Sobralia amabilis* (Reichb. f.) L. Wms.

Slender, caespitose (?), epiphytic or terrestrial herbs up to about 4 dm. tall. Leaves 4.5–10.5 cm. long and 3–8 mm. broad, narrowly elliptic to linear-lanceolate, acute or obtuse, apex 2–3-dentate, prominently plicate; leaf-sheaths concealing the stems, striate, glabrous. Inflorescence usually 1-flowered, from the axis of the uppermost leaf. Sepals 20–25 mm. long and 7–8 mm. broad, elliptic, acute, the laterals slightly arcuate, slightly connate at the base. Petals 2, 20–23 mm. long and 10–12 mm. broad, lanceolate to lanceolate-ovate, acute. Lip about 30 mm. long and about 20 mm. broad toward the apex, triangular-obovate in outline, emarginate, somewhat crenate, the lamina with 1 prominent, crispate lamella and with a prominent oblong-obovoid callus at the base. Column about 10–12 mm. long.

Panama.

COCLÉ: a specimen originally collected in Coclé, cultivated in the Canal Zone Experiment Gardens, *Lindsay 449*.

6. SOBRALIA FENZLIANA Reichb. f. in Bot. Zeit. 10:714. 1852.

Slender terrestrial or epiphytic herbs. Leaves 13–17 cm. long and 4–6 cm. broad, elliptic-oblong to lanceolate-ovate, acuminate. Sepals about 4 cm. long, elliptic or oblong-elliptic, acute. Petals a little shorter than the sepals, narrowly obovate, acute. Lip (4–6 cm. long?) obovate-orbicular, crenate-dentate anteriorally, ecarinate.

Panama.

CHIRIQUÍ: *Warscewicz 48*.

The description is taken from the original and an analysis of the type. Seems to differ from *S. Bouchei* only in lacking carinae on the lip.

7. SOBRALIA FRAGRANS Lindl. in Gard. Chron. 598. 1853.

Sobralia eublepharis Reichb. f. ex Kränzl. in Fedde Rep. Sp. Nov. 26:255, *t. 78*. 1929.

Relatively small, terrestrial or epiphytic herbs up to 35 cm. tall. Stems ancipitous, with the principal leaf near the middle. Leaves 6.5–23.5 cm. long and 1.5–5 cm. broad, narrowly elliptic to broadly lanceolate, acute or acuminate. Sepals 3–4 cm. long and 0.4–0.7 cm. broad, linear to oblong-lanceolate, acute or apiculate, the laterals somewhat falcate. Petals 3–4 cm. long and about 0.5 cm. broad, lanceolate to oblanceolate-linear, obtuse or acute, sometimes apiculate. Lip 28–35 mm. long and 16–20 mm. broad, oval to obovate, the anterior margin dentate-fimbriate, the posterior margins entire; disc with several thickened nerves and 2 callus thickenings at the base, pubescent especially toward the apex. Column about 16–18 mm. long.

British Honduras, Guatemala, Honduras, Costa Rica and Panama.

CHIRIQUÍ: San Felix to Cerro Flor, alt. 100–800 m., *Allen 1941*. VERAGUAS: headwaters of Río Cañazas, alt. 300–600 m., *Allen 167*. COCLÉ: between Las Margaritas and

El Valle, *Woodson, Allen & Seibert 1314.* PANAMÁ: drowned forest near Vigia and San Juan, *Dodge, Steyermark & Allen 16521.* CANAL ZONE: *Powell 114, 3404, 3424.*

Perhaps the most distinctive of the Panamanian species of the genus.

8. SOBRALIA LABIATA Warsz. & Reichb. f. in Bot. Zeit. 10:714. 1852.

A plant of unknown size. Leaves up to about 27 cm. long and 2 cm. broad, linear-lanceolate, acuminate. Sepals about 6 cm. long, oblong-lanceolate, acute. Petals about as long as the sepals and a little broader. Lip about 7–8 cm. long and 5–6 cm. broad, flabellate, anteriorally crenulate, retuse.

Panama.

CHIRIQUÍ: *Warscewicz.*

The description is taken from the original and a poor analysis of the type.

9. SOBRALIA LEUCOXANTHA Reichb. f. Beitr. Orch. Centr.-Am. 68. 1866; Hook. f. in Bot. Mag. 115: *t. 7058.* 1889.

Sobralia Powellii Schltr. in Fedde Rep. Sp. Nov. Beih. 17:11. 1922.

Tall, slender, terrestrial or epiphytic herbs up to 1.5 m. tall. Leaves 8–22 cm. long and 3–7 cm. broad, elliptic to lanceolate, acuminate, glabrous above, more or less scurfy below; leaf-sheaths verruculose or obscurely punctate. Inflorescence 1-flowered; the flowers large. Sepals and petals white, the lip white with the throat yellow to orange. Sepals 5–8.5 cm. long and 1.5–2.5 cm. broad, linear-lanceolate to oblong. Petals 5–7 cm. long and 2.5–3.5 cm. broad, oblong to obovate. Lip 5–7 cm. long and up to 5 cm. broad, obovate, enfolding the column, somewhat retuse, margin undulate, with short calluses at the base and 1–3 thickened nerves above. Column 3–4.6 cm. long.

Costa Rica and Panama.

COCLÉ: south of El Valle, alt. 600 m., *Allen 2839, 2840;* mountains beyond La Pintada, alt. 400–600 m., *Hunter & Allen 620.* PANAMÁ: Peluca Hydrographic Station, alt. about 90 m., *Hunter & Allen 648;* Gatún Lake, *Powell 2, 3329, 3330, 3331.*

There seems to be little or no difference between *Sobralia leucoxantha* and S. *Powellii.*

10. SOBRALIA LINDLEYANA Reichb. f. in Bot. Zeit. 10:713. 1852; Xenia Orch. 2:156, *t. 163.* 1868.

Slender epiphytic or terrestrial herbs up to 6 dm. tall. Leaves 5.5–13 cm. long and 2–5 cm. broad, elliptic-lanceolate to ovate-lanceolate, acuminate, often vernicose above; sheaths neither pubescent nor verruculose. Inflorescence 1-flowered; the flowers white or (with age?) yellowish, the lip with red maculations. Sepals 4–5 cm. long and 0.8–1.2 cm. broad, elliptic-lanceolate to elliptic-oblong, acute. Petals 3.5–4.5 cm. long and 1.2–1.4 cm. broad, similar to the sepals or broader. Lip 4–5 cm. long and 3–4 cm. broad, cuneate-flabellate or obovate, subtrilobate, the lobes rounded, apical part of the lip dentate-lacerate or crisped; disc with a tricornute callus at the base and pubescent longitudinally within. Column about 2 cm. long, with 2 acinaciform, terminal stelidia or auricles.

Fig. 71. *Sobralia panamensis*

Costa Rica and Panama.

CHIRIQUÍ: Llanos del Volcán, alt. 1120–1200 m., *Seibert 325;* Chiriquí Viejo Valley, *White 83;* "Chiriquí," *Warscewicz.*

11. SOBRALIA PANAMENSIS Schltr. in Fedde Rep. Sp. Nov. Beih. 17:11. 1922.

Sobralia panamensis var. *albiflos* Schltr. loc. cit.

Erect or ascending, epiphytic or terrestrial herbs; the stems up to about 15 dm. long, simple, branching or producing new plants at the nodes, lepidote or furfurescent. Leaves 5–20 cm. long and 2–6.5 cm. broad, elliptic to broadly elliptic-lanceolate, acuminate, glabrous or slightly furfurescent at the base dorsally; leaf-sheaths densely pubescent, lepidote or furfurescent, older sheaths appearing pustulate. Flowers purple to white. Sepals 4.5–6 cm. long and about 1.2–1.6 cm. broad, ligulate to lanceolate, acute, the laterals somewhat oblique. Petals a little shorter than the sepals and up to about 2 cm. broad, obtuse or acute. Lip 4–6 cm. long and 3–4 cm. broad, obovate or oblong-obovate, obtuse, glabrous, apex undulate, with 2 small calluses at the base. Column up to about 3 cm. long.

Panama.

COCLÉ: mountains beyond La Pintada, alt. 400–600 m., *Hunter & Allen 664.* PANAMÁ: Taboga Island, *Allen 106;* Bejuco, *Allen 2669;* Hacienda La Joya, *Dodge et al. 106c.* CANAL ZONE: Santa Rita Trail, *Cowell 146;* Quebrada Ancha, *Dodge & Steyermark 106a, 106b;* near Vigía and San Juan, *Dodge et al. 16557;* hills east of canal, *Powell 21, 31, 3082, 3086, 3105;* Barro Colorado Island, *Woodworth & Vestal 388.*

Sobralia panamensis is closely allied to S. *decora* Batem. and to S. *sessilis* Lindl. but seems to be distinct.

12. SOBRALIA DECORA Batem. var. AERATA Allen & Williams in Ann. Missouri Bot. Gard. 29:337, *t. 31.* 1942.

Slender, erect, epiphytic or terrestrial herbs up to about 5 or 6 dm. tall. Stems covered with the amplexicaul leaf-sheaths, simple or rarely branched. Leaves 8–16 cm. long and 1.3–5 cm. broad, lanceolate or lanceolate-ovate, acuminate, coriaceous. Inflorescence sessile, 1-flowered. Sepals 5.2–5.5 cm. long and 1.2–1.5 cm. broad, lanceolate, acute, greenish on the outer surface, very near "brick red" on the inner surfaces. Petals about 4.7 cm. long and 1–1.2 cm. broad, elliptic-lanceolate, acute, reflexed, washed "brick red" with lighter margins and dorsal median line, the inner surface "brick red" with a white border. Lip about 4 cm. long, more or less tubular but flaring at the apex, the disc "brick red" with a median white stripe and the lateral margins white toward the base, base of the lip "Acajou red" within.—Description from the type specimen and ample field notes.

The species is found from Mexico to Honduras. The variety only in Panama.

COCLÉ: bad lands south of El Valle de Antón, alt. 500–600 m., *Allen 2755, 2846.*

13. SOBRALIA ROLFEANA Schltr. in Fedde Rep. Sp. Nov. Beih. 17:12. 1922.

Erect, slender, probably terrestrial herbs up to about 1 m. tall. Leaves 6.5–21 cm. long and 2–7.5 cm. broad, oblong-elliptic to elliptic-oblanceolate or elliptic-lanceolate, acute to acuminate, glabrous and smooth, mostly near the

Fig. 72. *Sobralia decora* var. *aerata*

middle of the stem and above, reduced upward. Inflorescence probably consisting of a single flower in the axis of an upper leaf; flowers creamy-yellow with a lemon-yellow throat. Sepals 5.5–7.5 cm. long and 0.8–1.6 cm. broad, ligulate to elliptic or elliptic-lanceolate, acute, the laterals somewhat oblique. Petals 5.5–6.5

cm. long and 0.8–1.4 cm. broad, ligulate to oblong-ligulate, obtuse or acute. Lip 5.5–7 cm. long and 2.5–4.7 cm. broad, obovate, retuse, anterior margin lacerate-dentate, obscurely bilamellate at the base, glabrous. Column 2–3 cm. long, enfolding the lip.

Panama.

PANAMÁ: Cerro Campana, alt. 800 m., *Allen 2663*. CANAL ZONE: without definite locality, *Powell 3, 3327, 3357, 3358, 3374*. BOCAS DEL TORO: epiphyte with yellow flowers, *von Wedel 409*.

Sobralia Rolfeana is very closely allied to *S. leucoxantha* Reichb. f. and to *S. Lindleyana* Reichb. f.

14. SOBRALIA SUAVEOLENS Reichb. f. in Gard. Chron. n. s. 9:622. 1878.

Sobralia epiphytica Schltr. in Fedde Rep. Sp. Nov. 12:213. 1913.

Fig. 73. *Sobralia suaveolens*

Strict terrestrial or epiphytic herbs up to about 4 dm. tall. Leaves 5–19 cm. long and 2–4.5 cm. broad, elliptic to elliptic-lanceolate, acute; leaf-sheaths glabrous, not verrucose. Inflorescence usually 2–3-flowered, from the axils of the uppermost leaf; flowers small for the genus, yellow. Sepals and petals 20–25 mm. long and 4–5 mm. broad, linear-lanceolate, acute. Lip 20–25 mm. long and about 10–15 mm. broad, oval to ovate in outline, trilobulate toward the apex, with several (about 7) longitudinal lamellae which become lacerated toward the apex and are branched into two groups at the base; mid-lobe about 8 mm. long and broad, subquadrate. Column about 12 mm. long.

Panama.

PANAMÁ: Río La Maestra, alt. 0–25 m., *Allen 59*. CANAL ZONE: near Vigia and San Juan on R. Pequeni, alt. 66 m., *Dodge et al. 16623*; Río Indio de Gatún, alt. sea-level, *Maxon 4829*; around Culebra, alt. 50–150 m., *Pittier 4780*.

The type was a specimen collected near Colón and grown in England.

15. SOBRALIA VALIDA Rolfe in Kew Bull. 1909:65. 1909.

Stems robust, glabrous, 20–25 cm. tall, 3–4-leaved, base covered with 2 tubular sheaths. Leaves broadly elliptic, subacute, subplicate, glabrous, subcoriaceous, 12–20 cm. long, 6–8.5 cm. broad, amplexicaul; sheaths tubular, subcompressed, ancipitous, 3–5 cm. long. Spathe abbreviated, subfoliaceous, apex subacute.

Bracts small. Flowers few, appearing at intervals, ochroleucous, fragrant. Pedicels short, subincluded. Sepals subconnivent, lanceolate-oblong, acute, equal, more or less concave. Lip entire, oblong, obtuse, minutely crenulate, concave, about 4 cm. long; disc tricarinate, veins pilose at the apex. Column clavate, 2 cm. long; teeth linear-oblong, incurved, about 4 mm. long.

Panama.

DARIÉN: near the Darién Gold Fields, *Dr. Hodgkinson.*

No specimens were seen. The description is taken from the original Latin.

16. SOBRALIA WARSZEWICZII Reichb. f. in Bot. Zeit. 10:714. 1852; Beitr. Orch. Centr.-Am. 9, *t. 1, figs. 1, 1-2.* 1866.

Terrestrial herbs of unknown height. Stems robust, the younger ones hispidulous-pubescent, becoming glabrous and more or less verrucose with age. Leaves 13–18 cm. long and 4–6 cm. broad, elliptic-oval, acute or acuminate. Inflorescence a single terminal or subterminal flower; flowers average for the genus, purple. Sepals up to about 5 cm. long and 2 cm. broad, broadly oblanceolate. Petals about as long as and broader than the sepals, cuneate-obovate, acute. Lip about 5 cm. long and 3 cm. broad, flabellate, emarginate, apical part crisped, with 2 basal lamellae, somewhat verrucose at the base. Column 2–3 cm. long.

Panama.

CHIRIQUÍ: "Vulcanes von Chiriquí," alt. 1850 m., *Warscewicz 8.*

We have seen only a photograph and a record of the type.

OBSCURE SPECIES

SOBRALIA MACROPHYLLA Reichb. f. in Bot. Zeit. 10:713. 1852; Xenia Orch. 1:218, *t. 90.* 1856.

The type of this species is apparently a sterile specimen which was accompanied by the collector's sketch and color notes. Reichenbach later published a plate of the species and at the same time reduced the Brazilian *S. chlorantha* Hook. to synonymy. Inasmuch as the type is not satisfactory for diagnosis in this difficult genus we think it best to place *S. macrophylla* among the obscure species. It is possible that it and *S. Rolfeana* Schltr. are the same.

8. PALMORCHIS Barb. Rodr.

PALMORCHIS Barb. Rodr. Gen. & Sp. Orch. Nov. 1:169. 1877; Schweinf. & Correll in Bot. Mus. Leafl. Harv. Univ. 8:109. 1940.

Jenmania Rolfe in Kew Bull. 198. 1898, non Wächter, 1897.
Rolfea Zahlbr. in Jour. Bot. 36:493. 1898.
Neobartlettia Schltr. in Fedde Rep. Sp. Nov. 16:440. 1920.

Large or small, terrestrial, reed-like herbs. Leaves pergameneous, plicate-veined, petiolate, usually few. Inflorescence a terminal or axillary raceme or

panicle. Sepals equal or nearly so, connivent or somewhat spreading. Petals similar to the sepals but narrower and shorter. Lip erect from the base of the column and adnate with it toward the base along the median line, broader than the sepals and petals, enfolding the column, retuse or 3-lobed; the disc pubescent or glabrous, callused. Column elongated, slender, more or less arcuate, footless; anther incumbent, operculate, the terminal part fleshy and sterile; pollinia 4, pyriform, granular or subceraceous.

A small genus allied to *Sobralia*. There are eight or nine species with the center of distribution in northern South America. Specimens have not been often collected.

a. Disc of the lip without parallel lamellae; flowers about 13 mm. long. . 1. P. TRILOBULATA
aa. Disc of the lip with 5 parallel lamellae; flowers about 17 mm. long..... 2. P. POWELLII

1. PALMORCHIS TRILOBULATA L. Wms. in Ann. Missouri Bot. Gard. 28:415, *t. 20.* 1941.

Caespitose, terrestrial herbs up to 35 cm. tall. Stems up to about 15 cm. long and 4 mm. in diameter, bearing 3–4 leaves near the apex. Leaves subchartaceous, plicate; lamina of the mature leaves 10–22 cm. long and 3–6 cm. broad, elliptic, acute or acuminate, with 7 prominent nerves; petiole up to 7 cm. long, plicate, nervose. Inflorescence up to 7 cm. long, terminal, much exceeded by the leaves, few-flowered; rachis about 3–4 cm. long; bracts 1–1.5 cm. long and 1.5–5 mm. broad, elliptic to lanceolate-ovate, acute or acuminate. Flowers about 13 mm. long, white. Dorsal sepal about 12 mm. long and 3 mm. broad, spatulate-oblanceolate, obtuse, 3–5-nerved. Lateral sepals 10–12 mm. long and 3–4 mm. broad, arcuate, spatulate-oblanceolate, obtuse, 3–5-nerved, somewhat carinate along the mid-nerve dorsally. Petals 11–12 mm. long and about 2 mm. broad, linear-oblanceolate, obtuse, somewhat arcuate, 3-nerved. Lip about 10–12 mm. long and about 5–6 mm. broad near the apex, oblanceolate-flabellate, trilobulate at the apex, the base or claw adnate to the column along its median line for about 2–3 mm., more or less enfolding the column; disc of the lip pubescent, especially so toward the base, less pubescent and fleshy-thickened toward the apex; lateral lobes about 1 mm. long (free portion), rounded, obtuse; mid-lobe about 1.5 mm. long, transversely oblong, blunt, slightly exceeding the lateral lobes. Column slender, arcuate, about 10 mm. long; anther operculate, incumbent; pollinia 4, exappendiculate, ceraceous or appearing so, pyriform.

Panama.

COCLÉ: El Valle de Antón, alt. 1000 m., *Allen 2463*; alt. 500–700 m., *Seibert 459*.

2. PALMORCHIS POWELLII (Ames) Schweinf. & Correll in Bot. Mus. Leafl. Harv. Univ. 8:119. 1940.

Rolfea Powellii Ames, Sched. Orch. 7:32, *fig. 6.* 1924.

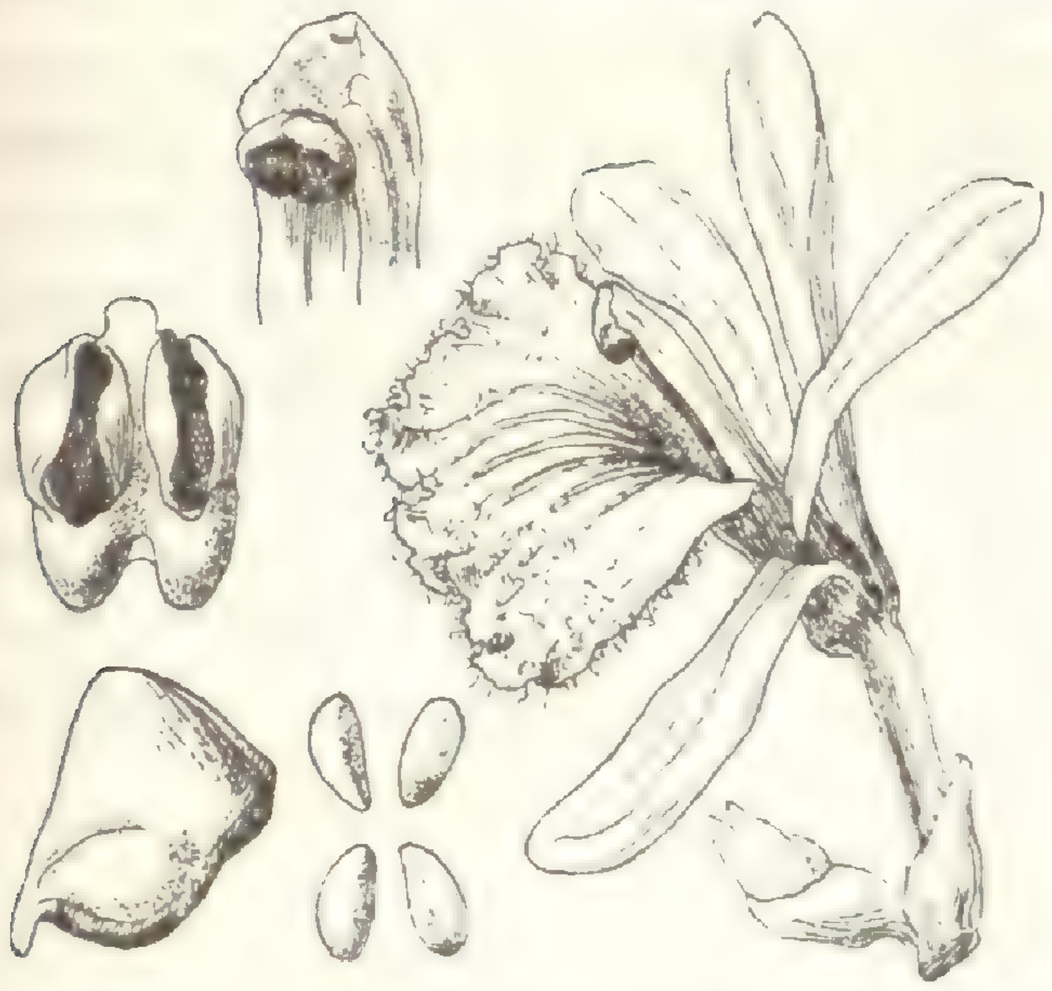


Fig. 74. *Palmorchis Powellii*

Caespitose, terrestrial herbs up to about 60 cm. tall. Stems about 30 cm. tall and 3–4 mm. in diameter. Leaves subchartaceous, plicate; lamina of the mature leaves 15–28 cm. long and 3–5 cm. broad, elliptic-lanceolate, acuminate, with 5–7 prominent nerves; petiole up to 8 cm. long, plicate, nervose. Inflorescence terminal or axillary, up to 5 cm. long, simple or branched; bracts 5–6 mm. long, ovate, acute. Flowers about 17 mm. long, white. Dorsal sepal about 15 mm. long and 3 mm. broad, spatulate, obtuse. Lateral sepals similar to the dorsal sepal but slightly arcuate. Petals about 15 mm. long and 3 mm. broad, rotundate-flabellate, trilobulate in front; disc pilose, with 5 parallel lamellae. Column about 12 mm. long, slender, arcuate.

Panama.

CANAL ZONE: Barro Colorado Island, *Starry 323*; "Juan Diaz," near Panamá City, *Powell 325*.

9. STENOPTERA Presl

STENOPTERA Presl, Rel. Haenk. 95, *t. 14*, 1827; L. Wms. in Caldasia 5:11. 1942. *Gomphichis* Lindl. Gen. & Sp. Orch. Pl. 446. 1840.

Terrestrial leafy herbs. Leaves radical or cauline, contracted or petiolate at the base. Inflorescence a terminal, compact or loose spike. Flowers mostly small, non-resupinate. Sepals subequal or the dorsal narrower, free or joined into a short tube at the base, subconnivent to recurved. Petals linear to nearly as broad as the sepals. Lip uppermost, erect or parallel to the column, contracted or unguiculate at the base, simple or 3-lobed lamina plane or concave or subgaleate. Column subterete, erect, wingless, glabrous or villous; anther erect in the clinandrium; pollen granular or dust-like. Capsule ovoid, erect.

The single species known in Panama has been referred to *Gomphichis*, but there are several species, unknown to Lindley, which seem absolutely to close the gap between the two presumed genera.

1. STENOPTERA COSTARICENSIS Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:375. 1918.

Gomphichis costaricensis Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 3:37. 1934.

Terrestrial herbs up to about 6 dm. tall. Leaves basal or those on the stem reduced to bracts, 7–30 cm. long and 2.5–3.5 cm. broad, mostly elliptic-lanceolate,

acute or acuminate, contracted at the base into a broad petiole. Scape erect, with several bracts which are reduced upward, villous above but glabrescent below. Inflorescence a spike 3–16 cm. long. Dorsal sepal about 8 mm. long and 2.5 mm. broad, broadly elliptic, acute or acuminate, cucullate, 1-nerved, pubescent dorsally. Lateral sepals similar to the dorsal but more oblong and oblique. Petals 3.5–5 mm. long and 2.5–3.5 mm. broad, elliptic-ovate, acute or obtuse, ciliate or subfimbriate, slightly cucullate, 3-nerved. Lip 4–5 mm. long and 3–4 mm. broad, 3-lobed, slightly unguiculate; lateral lobes rounded; terminal lobe ovate, about 2 mm. long and 1.5 mm. broad, fleshy, villous; disc fleshy, villous; with a small marginal callus on either side at the base. Column about 3 mm. long, terete, straight or nearly so. Capsule ovoid.

Costa Rica, Panama, and possibly South America.

CHIRIQUÍ: Bajo Chorro, alt. 2000 m., *Davidson 163, 309.*

This species is an Andean type and has several close allies, if not synonyms, in the Andes.

10. PRESCOTTIA Lindl.

PRESCOTTIA Lindl. in Hook. Exot. Fl. 2: *t. 115.* 1824.

Small terrestrial herbs with basal or semi-basal leaves. Leaves usually radical (Panama), sessile or petiolate, membranaceous, large or small. Inflorescence a terminal spike. Flowers small, non-resupinate. Sepals connate at their bases into a tube, spreading or revolute. Petals narrow, adnate to the base of the column, often revolute. Lip uppermost, unguiculate and with the claw adnate to the sepals, lamina plane to concave, cucullate or galeate, biauriculate at the base, often enclosing the column. Column short; stigmata 2; clinandrium erect, acuminate or subfilamentous, the margins adnate to the rostellum; pollen granular or powdery.

A small genus with but two distinctive species known in Panama.

a. Lamina of the leaf less than 7 cm. long; petiole much shorter than the lamina..... 1. P. OLIGANTHA
aa. Lamina of the leaf more than 7 cm. long (usually 10–20 cm.); petiole about as long as the lamina..... 2. P. STACHYODES

1. PRESCOTTIA OLIGANTHA (Sw.) Lindl. Gen. & Sp. Orch. Pl. 454. 1840; C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 7:20. 1938.

Cranichis oligantha Sw. Prodr. Veg. Ind. Occ. 120. 1788.
Prescottia panamensis Schltr. in Fedde Rep. Sp. Nov. 16:357. 1920.

Small erect terrestrial herbs up to about 32 cm. tall. Leaves 1.5–7 cm. long and 0.8–3 cm. broad, basal, membranaceous, suberect or spreading, elliptic to cordate or obovate, acute or obtuse; petiole shorter than the lamina, usually much shorter. Scape erect, slender, glabrous, with several bracts which are reduced upward. Inflorescence up to 10 cm. long, a densely flowered spike. Sepals 1.5–3 mm. long and 0.6–1 mm. broad, oblong-ovate, obtuse, the laterals oblique, connate

Fig. 75. *Prescottia oligantha*

into a short tube at the base and forming an inconspicuous mentum. Petals 1–1.5 mm. long and about 0.5 mm. broad, linear-oblong, obtuse, somewhat oblique. Lip 1.5–2 mm. long and as broad, suborbicular, strongly cucullate, with a small auriculate callus on either side at the base; the disc puberulent. Column about 0.5 mm. long.

Florida, Mexico, Costa Rica, Panama, the West Indies, Venezuela, and Colombia.

CHIRIQUÍ: Cerro Vaca, alt. 900–1000 m., *Pittier 5358*. COCLÉ: valley of upper Río Mata, alt. 350 m., *Allen 130;* vicinity of El Valle, alt. 600–1000 m., *Allen 1159*.

2. PRESCOTTIA STACHYODES (Sw.) Lindl. in Bot. Reg. 22: *sub t. 1916*. 1836; L. Wms. in Ann. Missouri Bot. Gard. 27:272. 1940.

Cranichis stachyodes Sw. Fl. Ind. Occ. 3:1427. 1799.

Terrestrial herbs, up to about 1 m. tall. Leaves basal, long-petiolate, large, membranaceous, suberect; petiole up to about 25 cm. long, slender; lamina 8–22 cm. long and 3–16 cm. broad (those of Panamanian specimens large), elliptic or elliptic-oval to broadly oval, acute, acuminate or obtuse, margin often sphacelate. Inflorescence a densely flowered spike up to about 30 cm. long. Sepals 3–5 mm. long and 0.75–1.25 mm. broad, linear-oblong, obtuse, 1-nerved, strongly coiled, connate at their bases into a short tube. Petals 3–5 mm. long and 0.2–0.5 mm. broad, linear, obtuse, 1-nerved. Lip 4–6 mm. long, strongly concave or calceiform, short-unguiculate, with a lateral callus on either side at the base, glabrous. Column about 2 mm. long.

Mexico, British Honduras, Guatemala, Honduras, Panama, the West Indies, Colombia, Brazil, and perhaps elsewhere in South America.

COCLÉ: vicinity of El Valle de Antón, alt. 600–1000 m., *Allen 1183;* same locality, *Allen 2064;* hills north of El Valle de Antón, vicinity of La Mesa, alt. about 1000 m., *Allen 2326;* mountains beyond La Pintada, *Hunter & Allen 623.*

11. CRANICHIS Sw.

CRANICHIS Sw. Nov. Gen. & Sp. Prodr. 8, 120. 1788.

Small terrestrial herbs with basal leaves or rarely with reduced cauline leaves. Leaves sessile or petiolate, membranaceous. Scape slender, simple, with several bracts. Inflorescence a terminal spike. Sepals free, similar, or the laterals often broader. Petals free or obscurely adnate to the base of the column. Lip uppermost (i. e. flowers non-resupinate), sessile or rarely unguiculate, adnate to the base or up to the middle of the column, erect, plane, concave or saccate. Column short; rostellum erect, often as long as the column; pollen granular.

A small genus with but one species known in Panama.

1. CRANICHIS MUSCOSA Sw. Nov. Gen. & Sp. Prodr. 120. 1788.

Small terrestrial herbs 10–38 cm. tall. Leaves petiolate, basal or semi-basal, usually with leaf-like bracts at the base of the scape, which are reduced upward; lamina 3–8 cm. long and 1–4 cm. broad, elliptic, elliptic-oval or oval, acute or obtuse, membranaceous; petiole 1–8 cm. long, usually a little shorter than the lamina. Dorsal sepal about 2.5 mm. long and 1 mm. broad, elliptic-lanceolate, cucullate, obtuse or acute. Lateral sepals about 2.5 mm. long and 1 mm. broad, ovate-lanceolate, oblique, obtuse or acute. Petals 2–3 mm. long and 0.3–0.5 mm. broad, linear or linear-oblanceolate. Lip 2.5–3 mm. long and 1.5–2 mm. broad, simple, strongly cucullate, elliptic-oval to oblong-oval, acute or acutish. Column 1–1.5 mm. long.

Florida, Mexico, Costa Rica, Panama, and the West Indies.

COCLÉ: vicinity of El Valle, alt. 800–1000 m., *Allen 74,* alt. 600–1000 m., *Allen 1235.*

12. PONTHIEVA R. Br.

PONTHIEVA R. Br. in Ait. Hort. Kew. ed. 2, 5:199. 1813; Benth. & Hook. Gen. Pl. 3:593. 1883.

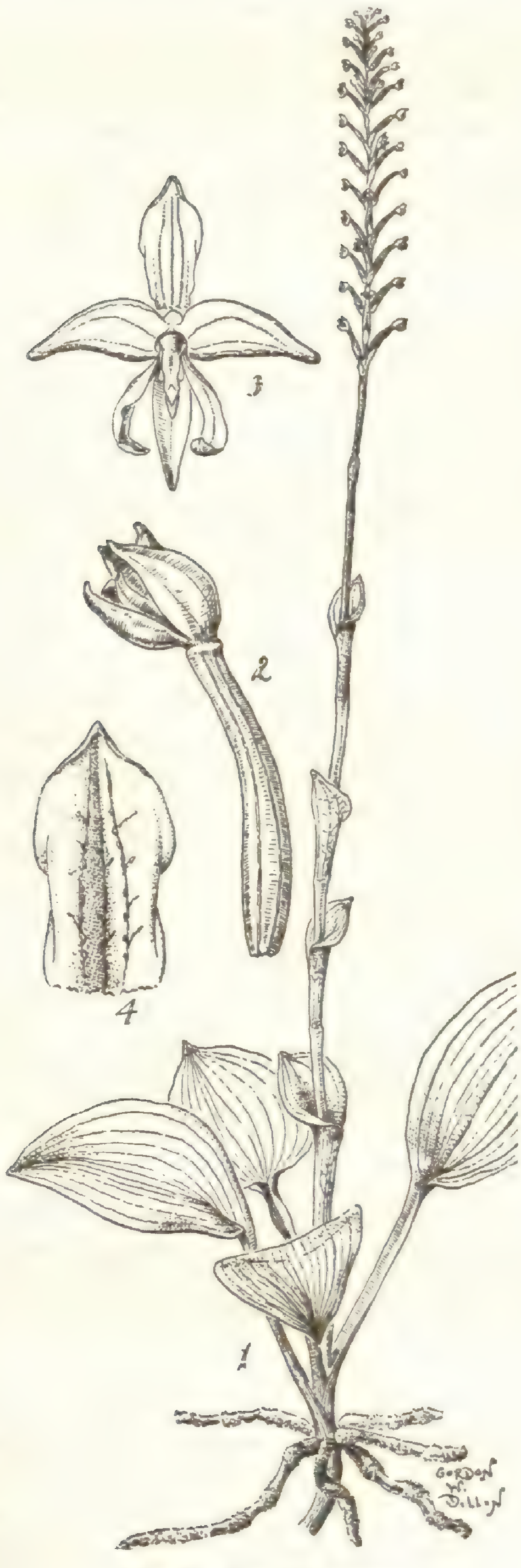


Fig. 76. *Cranichis muscosa*

Small glabrous or pilose terrestrial herbs with basal leaves and naked or bracteate scapes. Sepals free, spreading, subequal or dorsal smallest. Petals attached above the middle of the column, spreading. Lip uppermost (non-resupinate), adnate to the column by its unguiculate base, abruptly dilated from the claw. Pollinia granular.

A small genus limited to the warmer regions of the western hemisphere.

a. Leaves pilose-pubescent..... 3. P. MACULATA
aa. Leaves glabrous.
b. Lip with 2 small calluses at the base of the blade..... 1. P. EPHIPPIUM
bb. Lip without calluses at the base but the claw with a single callus.... 2. P. RACEMOSA

1. PONTHIEVA EPHIPPIUM Reichb. f. in Linnaea 28:382. 1856; L. Wms. in Ann. Missouri Bot. Gard. 26:280. 1939.

Small terrestrial herbs up to about 3.5 dm. tall. Leaves basal, 5–12 cm. long and 1.2–3.5 cm. broad, petiolate, variable, elliptic to oblong to oblanceolate to oval or subcordate, acute or obtuse, membranaceous. Inflorescence a few–several-flowered raceme on a bracteate peduncle, pubescent. Flowers small, white. Dorsal sepal 4.5–7 mm. long and 1.5–2.5 mm. broad, elliptic to broadly oblanceolate, acute, pubescent dorsally. Lateral sepals 4.5–7 mm. long and 2–5 mm. broad, obliquely ovate, acute or obtuse, pubescent dorsally. Petals 4–6.5 mm. long and 1–3 mm. broad, oblique and with the anterior margin developed into a large subbasal auricle or angle, unguiculate, obtuse. Lip 2–5 mm. long, trilobulate, unguiculate, attached near the apex of the column; the lamina from obovate in outline to transversely oblong, with 2 calluses near the base, mid-lobe small, about 0.5 mm. long; claw thickened.

Mexico, Guatemala, Honduras, and Panama.

CHIRIQUÍ: Finca Lérida to Boquete, alt. about 1300–1700 m., *Woodson, Allen & Seibert 1118.*

2. PONTHIEVA RACEMOSA (Walt.) Mohr in Contr. U. S. Nat. Herb. 6:460. 1901; Ames & Schweinf. in Sched. Orch. 10:14. 1930.

Arethusa racemosa Walt. Fl. Carol. 222. 1788.
Neottia glandulosa Sims in Bot. Mag. 21: *t. 842.* 1805.
Ponthieva glandulosa R. Br. in Ait. Hort. Kew. ed. 2, 5:200. 1813.
Ponthieva rostrata Lindl. in Ann. & Mag. Nat. Hist. 15:385. 1845.
Ponthieva oblongifolia Rich. & Gal. in Ann. Sci. Nat. III, 3:30. 1845.
Ponthieva guatemalensis Reichb. f. in Beitr. Orch. Centr.-Am. 63. 1866.
Ponthieva costaricensis Schltr. in Fedde Rep. Sp. Nov. Beih. 19:84. 1923.

Mostly small terrestrial herbs up to about 6 dm. tall, but usually about 2–3 dm. tall. Leaves basal, 4–30 cm. long and 1.5–6 cm. broad, variable, elliptic to oblanceolate to ovate to obovate, acute, petiolate, glabrous. Inflorescence pubescent, a few–many-flowered, loose raceme; bracts prominent. Dorsal sepal 4–7 mm. long and 1.5–3 mm. broad, lanceolate, acute or acuminate, pubescent dorsally. Lateral sepals 4.5–7 mm. long and 2–4 mm. broad, oblique, lanceolate to ovate-

Fig. 77. *Ponthieva racemosa*

lanceolate, acute, pubescent dorsally. Petals 4.5–6 mm. long and 2–4 mm. broad, obliquely subovate or subtriangular, unguiculate, obtuse. Lip 4–7 mm. long and 2–5.5 mm. broad, trilobulate, unguiculate, suborbicular to subquadrate in outline; lamina fleshy, cucullate at the base; claw fleshy with a conspicuous callus at its base.

Virginia to Florida and Louisiana (U.S.A.), Mexico, Guatemala, Honduras, Costa Rica, Panama, the West Indies, and in South America to Peru.

CHIRIQUÍ: Volcán de Chiriquí, alt. 3500–4000 m., *Woodson & Schery 469*. COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 1161*. PANAMÁ: San Juan Range, alt. near sea-level, *Powell 356*.

3. PONTHIEVA MACULATA Lindl. in Ann. & Mag. Nat. Hist. 15:385. 1845; Hook. f. in Bot. Mag. 108: *t. 6637*. 1882.

Ponthieva Brenesii Schltr. in Fedde Rep. Sp. Nov. Beih. 19:165. 1923.

Small pubescent terrestrial herbs up to about 3 dm. tall. Leaves basal, 5–20 cm. long and 0.8–5.2 cm. broad, variable, linear-lanceolate or oblanceolate to ovate, acute or acuminate, petiolate, strigose-pubescent on both surfaces, membranaceous. Inflorescence a few–several-flowered raceme on a slender bracteate peduncle. Dorsal sepal 9–14 mm. long and 3–4.5 mm. broad, elliptic to lanceolate, acute or acuminate, pubescent dorsally. Lateral sepals 9–14 mm. long and 5.5–8 mm. broad, broadly oval to obovate, obtuse, pubescent dorsally. Petals 6–9 mm. long and 2–3 mm. broad, oblique, obtuse, angled toward the base anteriorally, short-unguiculate, inserted above the middle of the column. Lip 3–4 mm. long and 2–3 mm. broad, oblong to suborbicular, trilobulate, cucullate, with a hood-shaped callus which forms a cavity at the base, inserted near the apex of the column.

Mexico, Costa Rica, Panama, Venezuela, Colombia and Ecuador.

CHIRIQUÍ: Cerro Punto to headwaters of Río Caldera, alt. 2250–2500 m., *Allen 1430*.

One of the most pubescent orchids in Panama.

13. SPIRANTHES L. C. Rich.

SPIRANTHES L. C. Rich. in Mém. Mus. Par. 4:50. 1818, *nom. conserv.*; Schltr. in Beih. Bot. Centralbl. 37, Abt. 2:317-454. 1920.

Gyrostachys Pers. Syn. Pl. 2:511. 1807.
Stenorrhynchus L. C. Rich. in Mém. Mus. Par. 4:59. 1818.
Pelexia L. C. Rich. loc. cit. 59.
Sarcoglottis Presl, Rel. Haenk. 1:95, *t. 15*. 1827.
Cyclopogon Presl, loc. cit. 93.
Beloglottis Schltr. in Beih. Bot. Centralbl. 37, Abt. 2:364. 1920.
Brachystele Schltr. loc. cit. 370.

Small, or rarely large, terrestrial (rarely epiphytic) herbs with basal or cauline leaves or both, or leafless. Roots often fleshy, fasciculated or tuberous. Leaves various, produced before, with, or after, the flowers. Sepals free; dorsal sepal usually erect and forming a galea with the petals; lateral ones erect or spreading,

affixed to the summit of the ovary, decurrent and forming a free or adnate mentum. Petals usually narrow and usually coherent to the dorsal sepal. Lip sessile or clawed, plane, concave or gibbous, simple or lobed, in some species bicaudate at the base, adherent to the column in almost all the species, ecallose or callose. Column terete; clinandrium often membranaceous and conspicuous, often continued into the rostellum; rostellum various, inconspicuous or conspicuous, truncate and retuse to lobed to aristate; anther dorsal, erect, sessile or stipitate; pollinia 2, powdery or granular, usually attenuated at one end.

A large and technical genus with its main center of distribution in Mexico.

a. Lip less than 8 mm. long.
  b. Lip less than 3 mm. long ..... 1. S. GUYANENSIS
 bb. Lip 5 mm. or more long.
  c. Lateral sepals linear-ligulate to ligulate; petals oblanceolate-ligulate .... 2. S. COSTARICENSIS
  cc. Lateral sepals linear-lanceolate to narrowly lanceolate-triangular; petals linear to narrowly elliptic ..... 3. S. PRASOPHYLLUM
aa. Lip 13 mm. long or longer.
  b. Lateral sepals forming a produced, acute or obtuse mentum at the base.
   c. Lip bicaudate at the base ..... 9. S. FUNCKIANA
   cc. Lip not bicaudate at the base ..... 8. S. ORCHIOIDES
  bb. Lateral sepals not forming a produced, obtuse or acute mentum at their base.
   c. Lip not bicaudate at the base; rostellum terete ..... 6. S. SPECIOSA
   cc. Lip bicaudate at the base; rostellum flattened or terete.
    d. Terminal part of the lip not oval nor suborbicular nor with pubescent callus-ridges; rostellum terete ..... 7. S. NAVARRENSIS
    dd. Terminal part of the lip oval or suborbicular or with pubescent callus ridges; rostellum flattened.
     e. Base of the stem leafy; plants from rhizomes ..... 4. S. WOODSONII
     ee. Base of the stem not leafy; plants from fascicled roots ..... 5. S. ACAULIS

1. SPIRANTHES GUYANENSIS (Lindl.) Cogn. in Mart. Fl. Bras. 3^4:209, *t. 47, f. II.* 1895.

Goodyera guyanensis Lindl. Gen. & Sp. Orch. Pl. 494. 1840.
Brachystele guyanensis Schltr. in Beih. Bot. Centralbl. 37, Abt. 2:373. 1920.
Spiranthes aguacatensis Reichb. f. in Bonplandia 3:214. 1855; Ames, Sched. Orch. 2:7. 1923.
Gyrostachys aguacatensis O. Ktze. Rev. Gen. 2:664. 1891.
Brachystele aguacatensis Schltr. loc. cit. 371.

Erect terrestrial herbs up to 20 cm. tall. Stems with several loose, lanceolate or ovate-lanceolate, acuminate bracts. Leaves unknown. Inflorescence up to 6 cm. long, densely flowered. Dorsal sepal 2–3 mm. long and about 0.7–1.5 mm. broad, lanceolate, acute or obtuse. Lateral sepals 2–3 mm. long and 0.7–1.5 mm. broad, lanceolate-triangular, acute or obtuse, somewhat oblique. Petals 2–2.5 mm. long and 0.6–0.9 mm. broad, oblanceolate-spatulate, truncate, or obtuse, coherent to the dorsal sepal, unguiculate. Lip 2–2.8 mm. long and 1.7–2.2 mm. broad, oblong-pandurate to ovate or suborbicular and constricted toward the apex, the terminal lobe small, oblong to suborbicular, with two retrorse auricles or caudae at the base.

Mexico, Guatemala, Honduras, Costa Rica, Panama, Trinidad, the Guianas, Colombia, and Bolivia.

CANAL ZONE: open fields near railway station, Monte Lirio, *Maxon 6862*.

The smallest-flowered species of *Spiranthes* in Panama.

2. SPIRANTHES COSTARICENSIS Reichb. f. in Bonplandia 3:214. 1855; Beitr. Orch. Centr.-Am. 46. 1866; Xenia Orch. 2:185, *t. 179, f. 1, 1-3b.* 1868; Ames, Sched. Orch. 9:7. 1925.

Gyrostachys costaricensis O. Ktze. Rev. Gen. 2:664. 1891.
Beloglottis costaricensis Schltr. in Beih. Bot. Centralbl. 37, Abt. 2:365. 1920.
Spiranthes subpandurata Ames & Schweinf. Sched. Orch. 8:4, *f. 1.* 1925.

Erect terrestrial or epiphytic herbs with basal leaves, or leafless at flowering time, up to 4.5 dm. tall. Leaves 3–18 cm. long and 1–5 cm. broad, elliptic to oval or oblanceolate, acute or acuminate, membranaceous, petiolate; petiole 2–8 cm. long. Inflorescence a few–many-flowered raceme, up to about 20 cm. long. Dorsal sepal 4–6.5 mm. long and 1–1.5 mm. broad, lanceolate, acute, pubescent dorsally. Lateral sepals 4–6.5 mm. long and 0.7–1.3 mm. broad, linear-ligulate to ligulate, acute or obtuse, pubescent dorsally. Petals 3.5–6 mm. long and 0.7–1 mm. broad, oblanceolate-ligulate, acute or obtuse, oblique, coherent to the dorsal sepal. Lip 5–6.5 mm. long and 1.5–2 mm. broad, lanceolate-pandurate, short-unguiculate, retrorsely bicaudate at the base.

Mexico, Guatemala, Honduras, Costa Rica and Panama.

CANAL ZONE: upper Chagres River Range, *Powell 377*.

A species easy to distinguish because of the unusual lip shape.

3. SPIRANTHES PRASOPHYLLUM Reichb. f. Beitr. Orch. Centr.-Am. 65. 1866; Ames, Sched. Orch. 9:8. 1925.

Gyrostachys Prasophyllum O. Ktze. Rev. Gen. 2:664. 1891.
Spiranthes epiphytica Schltr. in Fedde Rep. Sp. Nov. 2:130. 1906.
Cyclopogon Prasophyllum Schltr. in Beih. Bot. Centralbl. 37, Abt. 2:393. 1920.

Small epiphytic herbs 8–25 cm. tall, with basal leaves. Leaves short-petiolate; lamina 3–13 cm. long and 0.8–2.8 cm. broad, elliptic, acute; petiole 1–4 cm. long. Inflorescence 2–8 cm. long, the flowers often unilateral. Dorsal sepal 5–6 mm. long and 1–1.5 mm. broad, lanceolate, acute or acuminate, pubescent at the base dorsally. Lateral sepals 5–6.5 mm. long and 1–1.8 mm. broad, linear-lanceolate to narrowly lanceolate-triangular, acute, pubescent at the base dorsally. Petals 4–5 mm. long and 0.5–1 mm. broad, linear to narrowly elliptic, acute or obtuse, coherent to the dorsal sepal. Lip 5–7 mm. long and 2–3 mm. broad, narrowly oblong-pandurate to lanceolate-ovate and constricted toward the apex; apical lobe oblong to transversely oval or reniform, bicaudate at the base, the caudae retrorse or incurved.

Guatemala, Honduras, Costa Rica, and Panama.

COCLÉ: north of El Valle de Antón, alt. about 1000 m., *Allen 2904*. CANAL ZONE: Gatún, *Hayes 138*; forest, Río Indio at Gatún, *Maxon 4816*.

Fig. 78. *Spiranthes Prasophyllum*

4. SPIRANTHES WOODSONII L. Wms. in Ann. Missouri Bot. Gard. 29:337. 1942.

Terrestrial palustrine herbs up to 5.5 dm. tall. Rhizomes slender, rooting at most of the nodes, with scarious sheaths arising from the nodes. Stems slender, with well-developed leaves at the base which become bract-like above, glabrous

below but becoming densely pubescent above. Leaves 3–10 cm. long, 1.3–2.8 cm. broad, oblong-elliptic to oval, acute or obtuse, largest near the base of the stem and reduced to amplexicaul bracts above. Inflorescence up to 10 cm. long, flowers congested, becoming more open in fruit; bracts up to 4 cm. long and 1.6 cm. broad, lanceolate, acuminate, pubescent dorsally. Flowers large, similar to those of *S. acaulis*. Dorsal sepal 16.5–19 mm. long and 3.5–4 mm. broad, lanceolate, acuminate, 3–5-nerved, densely pubescent dorsally. Lateral sepals long-decurrent on the ovary, 35–40 mm. long from the apex to the base of the saccate mentum; free part 16.5–19 mm. long and 4–4.5 mm. broad, lanceolate, acuminate, arcuate, spreading, densely pubescent dorsally, 3–5-nerved. Petals 15–18 mm. long and 2–2.5 mm. broad, narrowly elliptic to narrowly oblanceolate, pubescent or ciliate near the margins of the basal half. Lip 28–32 mm. long and 6–7 mm. broad (apical lobe), linear-oblong and somewhat expanded and pandurate in the terminal third, caudate, with two extremely pubescent converging callus-ridges on the terminal third, the basal part densely pubescent and the remainder, except the glabrous apex, less pubescent, glabrous dorsally except at the base; terminal lobe oval or transversely rhombic; caudae about 5 mm. long, retrorse, fleshy but flattened.

Panama.

CHIRIQUÍ: vicinity of El Boquete, alt. 1000–1500 m., *Cornman 2050;* vicinity of Boquete, alt. 1200–1500 m., *Woodson & Schery 753;* in swampy meadows, Finca Lérida to Boquete, alt. about 1300–1700 m., *Woodson, Allen & Seibert 1148.*

Very few species of *Spiranthes* have rhizomes.

5. SPIRANTHES ACAULIS (J.E.Sm.) Cogn. in Mart. Fl. Bras. 3[4]:221. 1895.

Neottia acaulis J. E. Smith, Exot. Bot. 2:91, *t. 105.* 1806.
Arethusa picta Anders. in Trans. Soc. Arts. 25. 1807.
Neottia picta R. Br. in Ait. Hort. Kew. ed. 2, 5:199. 1813; Sims in Bot. Mag. 37: *t. 1562.* 1813.
Sarcoglottis picta Klotzsch in Allgem. Gartenz. 10:106. 1842; Schltr. in Beih. Bot. Centralbl. 37, Abt. 2:419. 1920.
Gyrostachys picta O. Ktze. Rev. Gen. 2:664. 1891.
Sarcoglottis Hunteriana Schltr. in Fedde Rep. Sp. Nov. Beih. 17:13. 1922.
Sarcoglottis Powellii Schltr. loc. cit. 14.
Sarcoglottis Purpusiorum Schltr. in Fedde Rep. Sp. Nov. 21:333. 1925.

Large terrestrial herbs with basal leaves or with the leaves withered at flowering time, up to 1 m. tall but more commonly 3–4 dm. tall. Leaves petiolate or epetiolate; lamina 6–18 cm. long and 4–7 cm. broad when mature, elliptic to oval to oblanceolate or obovate, acute or obtuse, membranaceous, mottled; petiole short or none. Inflorescence up to 2 dm. long, few–many-flowered; bracts up to 4 cm. long, linear to linear-lanceolate, acuminate. Dorsal sepal 15–22 mm. long and 3–4 mm. broad, ligulate, acute, pubescent dorsally. Lateral sepals 40–50 mm. long and 4–7 mm. broad, free part 18–28 mm. long, lanceolate, acute, arcuate, pubescent dorsally, basal part decurrent on the ovary and extending almost to the base. Petals 14–24 mm. long and 2–4 mm. broad, linear-lanceolate or usually

linear-oblanceolate, acute or obtuse, slightly arcuate, coherent to the dorsal sepal. Lip 30–40 mm. long and 7–11 mm. broad, essentially narrowly oblanceolate, obtuse, the dilated apical portion constricted and with an oval or suborbicular terminal lobe, disc pubescent below the constriction, bicaudate at the base, the caudae fleshy, retrorse.

From Mexico through Central America and the West Indies, in South America to northern Argentina.

CANAL ZONE: Culebra, *Pittier 3427;* near Panama City, San Juan, Manteca, Mata Redonda, Juan Diaz, Arias Hill, Frijoles, *Powell 147, 179, 388, 389, 390, 391, 392, 394, 395, 398, 399, 3435, 3521, 3525, 3531, 3532, 3534, 3536, 3541, 3551, 3567, 3568, 3569, 3570.*

Known in Panama only from the Canal Zone where it grows in fairly open situations. A variable species.

6. SPIRANTHES SPECIOSA (J. F. Gmel.) A. Rich. in La Sagra, Hist. Isla Cub. ed. 2, 11:252. 1850.

Satyrium plantagineum L. Syst. Veg. ed. 10, 1244. 1758-59, non *Spiranthes plantaginea* Lindl., Spreng. vel Torr.
Serapias speciosa J. F. Gmel. Syst. 59. 1791.
Neottia speciosa Jacq. Ic. Pl. Rar. 3: *t. 600.* 1793; Sims' Bot. Mag. 33: *t. 1374.* 1811; Hook. Exot. Fl. 1: *t. 3, 4.* 1823.
Stenorrhynchus speciosus L. C. Rich. in Mém. Mus. Par. 4:59. 1818.
Spiranthes colorata N. E. Br. in Gard. Chron. n. s. 19:210. 1883.

Erect terrestrial or epiphytic herbs up to 4 dm. tall, with a rosette of basal leaves at flowering time. Leaves 4–18 cm. long and 1–8 cm. broad, elliptic to ovate or obovate, acute or acuminate; petioles 2–15 cm. long. Stems with several amplexicaul bracts. Inflorescence up to 10 cm. long, flowers congested; bracts up to 5 cm. long, linear-lanceolate, acuminate, usually red. Dorsal sepal 12–14 mm. long and 3–4 mm. broad, lanceolate, acute or acuminate, glabrous. Lateral sepals 12–15 mm. long and 3–4 mm. broad, lanceolate to narrowly lanceolate-triangular, acute or acuminate, forming a short mentum at the base. Petals 12–14 mm. long and 3–3.5 mm. broad, lanceolate or elliptic-lanceolate, somewhat arcuate, acute or acuminate, coherent to the dorsal sepal. Lip 13–15 mm. long and 4.5–5 mm. broad, terminal lobe lanceolate or oblong, acute, basal part oblong, pandurate, the basal margins somewhat thickened, disc pubescent.

Mexico, Guatemala, Honduras, Costa Rica, Panama, the West Indies, and in South America.

CHIRIQUÍ: vicinity of "New Switzerland," central valley of Río Chiriquí Viejo, alt. 1800–2000 m., *Allen 1382;* Salta Boquete, Boquete District, alt. 5500 feet, *Terry 1267.*

7. SPIRANTHES NAVARRENSIS (Ames) L. Wms. in Ann. Missouri Bot. Gard. 29:337. 1942.

Stenorrhynchus navarrensis Ames, Sched. Orch. 9:13, *f. 3.* 1925.

Erect or ascending terrestrial herbs up to about 5 dm. tall. Leaves basal, petiolate; lamina 7–16 cm. long and 3.5–8.5 cm. broad, narrowly to broadly

ovate, acuminate, membranaceous, often oblique; petiole 9–20 cm. long, winged and closed or sheathing at the base. Peduncle usually erect, with several membranaceous, sheathing bracts. Inflorescence up to 10 cm. long, few–many-flowered. Dorsal sepal 18–21 mm. long and 3.5–4.5 mm. broad, lanceolate, acute. Lateral sepals 18–22 mm. long and 3–4 mm. broad, lanceolate, more or less oblique. Petals 16–20 mm. long and about 2 mm. broad, linear-lanceolate, acute, subsigmoid, connate to the dorsal sepal. Lip 16–18 mm. long and 4–7 mm. broad, essentially lanceolate, constricted just above the base and again above the middle, auriculate at the base, the auricles fleshy. Anther up to 11 mm. long.

Costa Rica and Panama.

CHIRIQUÍ: cloud forest, Cerro Horqueta, alt. about 2000 m., *von Hagen & von Hagen 2111.*

Closely allied to *S. speciosa.*

8. SPIRANTHES ORCHIOIDES (Sw.) L. C. Rich. in La Sagra, Hist. Isla Cuba, ed. 2, 11:252. 1850.

Satyrium orchioides Sw. Nov. Gen. & Sp. Prodr. 118. 1788.
Neottia orchioides Sw. Fl. Ind. Occ. 3:1411. 1799; Sims in Bot. Mag. 25: *t. 1036.* 1807; Edwards' Bot. Reg. 9: *t. 701.* 1823.
Stenorrhynchus orchioides L. C. Rich. in Mém. Mus. Par. 4:59. 1818.
Spiranthes jaliscana S. Wats. in Proc. Am. Acad. 26:153. 1891.
Stenorrhynchus jaliscana Nash in Bull. Torr. Bot. Club 22:158. 1895.

Strict, leafless (at flowering time), terrestrial herbs up to 7 dm. tall but normally about 3 dm. tall. Leaves appearing after the flowering stage, 15–21 cm. long and 2.5–4 cm. broad, elliptic, membranaceous. Stems with several amplexicaul bracts which occasionally become leaf-like below. Sepals connivent or spreading at the tips, pubescent dorsally. Dorsal sepal 13–21 mm. long and 3–6 mm. broad, lanceolate, acute. Lateral sepals 18–27 mm. long and 3–4.5 mm. broad, lanceolate, acute, the bases decurrent on the ovary and at the base forming a protruded, acute or obtuse mentum. Petals 12–15 mm. long and 2.2–4.5 mm. broad, elliptic to elliptic-linear, acute or obtuse, coherent to the dorsal sepal. Lip 15–23 mm. long and 5.5–9 mm. broad, lanceolate, acute or acuminate, the margins of the broad claw fleshy and pubescent.

Florida and Mexico through Central America to Panama, the West Indies, and in South America to northern Argentina.

CANAL ZONE: Summit, alt. 75 m., *Allen 2453;* Bella Vista, Ceiba Tierra, Monte Lirio, near Gatún, La Chorrera, Tecúmen, Tapia, Mt. McComber, Mata Redonda, *Powell 386, 387, 393, 396, 402, 404, 407, 408, 409, 410, 414, 3454, 3527, 3547, 3557, 3559.*

The flowers of this species vary in color from white to brilliant red. In Panama they are often greenish. A widespread and variable species.

9. SPIRANTHES FUNCKIANA Rich. & Gal. in Ann. Sci. Nat. III, 3:32. 1845.

Pelexia Pringlei Fernald in Proc. Am. Acad. 35:562. 1900.
Pelexia Funckiana Schltr. in Fedde Rep. Sp. Nov. 15:197. 1918, as *P. Funkiana;* Ames & Schweinf. Sched. Orch. 8:3. 1925.

Fig. 79. *Spiranthes orchioides*

Pelexia guatemalensis Schltr. loc. cit. 197.
Pelexia congesta Ames & Schweinf. Sched. Orch. 10:5. 1930.

Slender terrestrial herbs up to 4.5 dm. tall. Leaves basal, petiolate; lamina 6–13 cm. long and 1.5–5 cm. broad, lanceolate to ovate, acute or acuminate, membranaceous; petiole 3–10 cm. long. Inflorescence up to 13 cm. long, several–many-flowered, lax or dense; bracts 1–3 cm. long, linear or linear-lanceolate, acuminate, somewhat pubescent dorsally. Dorsal sepal 14–19 mm. long and 4–5 mm. broad, oblanceolate, obtuse or acute, pubescent dorsally. Lateral sepals 25–35 mm. long and 3–3.5 mm. broad, linear-oblanceolate, acute, pubescent dorsally, oblique, free part strongly recurved, 14–18 mm. long, the basal part adnate to and decurrent on the ovary, 12–16 mm. long, forming a free spur-like projection at the base. Petals 14–19 mm. long and 2.5–3 mm. broad, linear-oblanceolate, acute or obtuse, coherent to the dorsal sepal. Lip 18–27 mm. long and 4–6.5 mm. broad, linear, subpandurate, with two retrorse auricles at the base, the disc puberulent toward the base.

Mexico, Guatemala, Honduras, Panama, and possibly South America.

COCLÉ: hills north of El Valle de Antón, vicinity of La Mesa, alt. about 1000 m., *Allen 2315*.

14. ERYTHRODES Blume

ERYTHRODES Blume, Bijdr. Fl. Nederl. Ind. 410, *t. 72*. 1825.
Physurus L. C. Rich. in Mém. Mus. Par. 4:55. 1818, *nomen*.

Terrestrial herbs with semi-basal or cauline leaves. Sepals free, nearly equal, erect or spreading. Petals connate toward their apices and usually coherent to the dorsal sepal and with it forming a galea. Lip simple or lobed, slightly adnate to the column for a short way, extended into a simple or didymous spur at the base which usually contains four or more mammillate calli or callus-like structures at the base. Column short. Pollinia sectile or granular.

A genus found in the tropics and subtropics of both hemispheres. The species are difficult to interpret.

A single species recognized in Panama.

1. ERYTHRODES KILLIPII Ames in Proc. Biol. Soc. Wash. 34:150. 1921.

Erect or ascending terrestrial herbs from a creeping rhizome, up to 1 m. or more long. Stems leafy toward the base, slender. Leaves petiolate; lamina 6–13 cm. long and 2–4.5 cm. broad, lanceolate to ovate or suborbicular, acuminate or acute, often oblique, membranaceous; petioles 2–5 cm. long, inflated and scarious at the base, semiamplexicaul. Sepals connate nearly to their apices. Dorsal sepal 5–7 mm. long and 2–3 mm. broad, lanceolate to oblong-lanceolate, obtuse or acute, pubescent dorsally. Lateral sepals 5.5–7 mm. long, 1.5–2.5 mm. broad, narrowly elliptic to oblong-lanceolate, obtuse or acutish, pubescent dorsally. Petals 5–6.5 mm. long and 1.5–2.5 mm. broad, oblanceolate, obtuse. Lip saccate; lamina

5–6.5 mm. long and 2.5–3.5 mm. broad, the basal part oblong, canaliculate, fleshy, the terminal lobe bi- or trilobulate, transverse, often ciliolate; sac 4–5 mm. long, obtuse, straight or curved slightly.

COCLÉ: vicinity of El Valle, alt. 1000 m., *Allen 1201* and *1792*. CHIRIQUÍ: Bajo Chorro, alt. 6000 feet, *Davidson 317*; valley of the Río Caldera from El Boquete to the Cordillera, alt. 1400–1600 m., *Killip 3561*.

More adequate material may show that the specimens from Coclé represent a different species.

15. CORYMBORCHIS Thouars

CORYMBORCHIS Thouars, Orch. Iles Afr. *tt. 37, 38*. 1822.
Corymbis Thouars, loc. cit., is *Corymborchis* by elision.

Terrestrial herbs with plicate or subplicate leaves and often with branched stems. Sepals and petals connivent into a tube at the base, usually linear with the petals dilated at the apex. Lip canaliculate, erect from the base of the column and free from it, apex usually dilated and recurved. Column erect, slender, the apex clavate, bilobed; anther erect, acuminate, subequal to the rostellum; pollinia 2, granular.

The genus is pantropic, with two species in the western hemisphere.

1. CORYMBORCHIS FLAVA (Sw.) O. Ktze. Rev. Gen. Pl. 2:658. 1891.

Serapias flava Sw. Nov. Gen. & Sp. Pl. Prodr. 119. 1788.
Corymbis flava Hemsl. in Godm. & Salv. Biol. Centr.-Am. Bot. 3:297. 1884.

Tall, slender, terrestrial, leafy herbs up to 15 dm. tall. Stems up to about 6 mm. in diameter, covered with the leaf sheaths. Leaves when mature 25–45 cm. long and 3.5–7 cm. broad, elliptic or elliptic-lanceolate, acuminate, plicate, sessile or nearly so. Inflorescence a simple raceme or a panicle from the axils of the upper leaves, up to 13 cm. long; bracts up to 10 mm. long, ovate, acute. Dorsal sepal 13–15 mm. long and about 2.5 mm. broad, linear to linear-lanceolate, acute. Lateral sepals 13–15 mm. long and about 2 mm. broad, linear or linear-lanceolate, acute or arcuate. Petals 13–14 mm. long and about 4 mm. broad, oblanceolate, acute. Lip 12–15 mm. long and 4–7 mm. broad, lanceolate to ovate-lanceolate, acute, cucullate, with a callus ridge extending along the margins from the base up to the middle or beyond.

British Honduras, Salvador, Costa Rica, Panama, the West Indies, also in South America.

CHIRIQUÍ: llanos, on slope of Volcán de Chiriquí Viejo, alt. 1200 m., *Allen 1009*.

16. STELIS Swartz

STELIS Swartz in Schrader's Jour. f. Bot. 2:239. 1799; in Svenska Vet.-Akad. Handl. 21:248. 1800, *nom. conserv.*

Humboltia Ruiz & Pavon, Fl. Peruv. et Chil. Prodr. 121, *pl. 27*. 1794, non Vahl.

Small to fairly large epiphytic herbs with caespitose or repent stems; secondary stems terminated by a single, usually fleshy, often petiolate leaf. Sepals subequal or the dorsal longest, more or less connate at the base, the laterals sometimes connate to their tips *(S. Allenii)*. Petals much smaller than the sepals, broad, often flabellate, anterior margin usually thickened. Lip sessile, simple or 3-lobed, usually fleshy and about as long as the column. Column short, footless; stigmas confluent or separated. Anther terminal, operculate, incumbent, biloculate; pollinia 2, ceraceous.

A difficult genus to study because the petals and lip are usually very small and often extremely fleshy.

a. Lateral sepals conspicuously shorter than the dorsal sepal, connate to the middle or beyond.
  b. Lip ovate with the thick central callus concave in front ..... 3. S. DESPECTANS
  bb. Lip not ovate, without a thickened central callus.
    c. Dorsal sepal more than 10 mm. long, lanceolate ..... 1. S. ALLENII
    cc. Dorsal sepal less than 5 mm. long, oblong ..... 2. S. INAEQUALIS
aa. Lateral sepals not conspicuously shorter than the dorsal sepal, connate only at their bases.
  b. Lip up to more than twice as long as broad.
    c. Dorsal sepal 3.5 mm. or more broad; leaves 3 cm. or more broad ..... 5. S. MONTANA
    cc. Dorsal sepal less than 3 mm. broad; leaves 2 cm. or less broad.
      d. Sepals 4 mm. or more long, lanceolate-ovate to oblong-lanceolate, inner surface glandular ..... 7. S. SKUTCHII
      dd. Sepals 3 mm. or less long, triangular to orbicular.
        e. Lip 1–1.5 mm. long; sepals triangular ..... 6. S. ATRORUBENS
        ee. Lip 0.5–0.6 mm. long; sepals ovate to orbicular ..... 4. S. MICROCHILA
  bb. Lip about as long as broad or broader than long.
    c. Lip produced into an apicule or acumen in front.
      d. Lip produced into a broad acumen, acumen not erect ..... 8. S. HYMENANTHA
      dd. Lip produced into an inconspicuous apicule (sometimes 3) or a fleshy erect apicule.
        e. Apicule fleshy, erect ..... 9. S. CRESCENTIICOLA
        ee. Apicule not fleshy, erect.
          f. Sepals 2–4 mm. long, usually 3-nerved ..... 11. S. ENDRESII*
          ff. Sepals 4–9 mm. long, usually 5-nerved ..... 10. S. LEUCOPOGON*
    cc. Lip not produced into an apicule or acumen in front.
      d. Callus of the lip cruciform; bracts on rachis prominent, acute or acuminate ..... 12. S. POWELLII
      dd. Callus of the lip not cruciform.
        e. Callus of the lip longitudinal; lip with two minute auricles at the base; plants mostly less than 5 cm. tall ..... 13. S. STORKII
        ee. Callus of the lip transverse; lip without auricles at the base; plants mostly more than 5 cm. tall.
          f. Inflorescence subequal to or shorter, or but slightly longer than the subtending leaves ..... 14. S. MAXONII
          ff. Inflorescence twice or more longer than the subtending leaves, and ..... 15. S. PANAMENSIS**
            g. Secondary stems usually 3 cm. long or longer.
              h. Sepals densely glandular-pubescent within ..... 16. S. VESTITA
              hh. Sepals not densely glandular-pubescent within, rarely pubescent ..... 17. S. AEMULA
            gg. Secondary stems 3 cm. or less long.
              h. A callus-ridge running at right angles to the transverse callus toward base of lip ..... 18. S. COLLINA

Fig. 80. *Stelis Allensii*

hh. No callus-ridge running at right angles to the transverse callus.
i. Sepals 3.5–4.5 mm. long..... 19. S. WILLIAMSII
ii. Sepals 1.5–2.5 mm. long.
j. Bracts of the inflorescence almost contiguous..... 17. S. AEMULA
jj. Bracts of the inflorescence well separated..... 20. S. LONGIPETIOLATA

* These two species appear somewhat different but perhaps are not distinct.
** S. *panamensis* would seem to key out here also, but the material available is so scanty that it can not be properly placed.

1. STELIS ALLENII L. Wms. in Ann. Missouri Bot. Gard. 29:338. 1942.

Large caespitose epiphytic herbs up to 4 dm. tall. Secondary stems 7–15 cm. long and 0.25–0.35 cm. in diameter, covered with two or three loose sheaths which soon disentegrate, shorter than the leaves. Leaves 10–19 cm. long and 3.5–7 cm. broad, elliptic to elliptic-oval, acute or obtuse, coriaceous, attenuated into a short petiole at the base. Inflorescence up to 30 cm. long, floriferous to the base, one or more borne from the apex of the stems (if more than one then presumably borne in different years); sheaths up to 2.5 cm. long, cucullate, ample; bracts 2–18 mm. long, reduced upwards, ovate-lanceolate, acute or acuminate, infundibuliform; flowers largest of the genus. Dorsal sepal 14–16 mm. long and 5–6 mm. broad, lanceolate, acute, 11–13-nerved, cucullate. Lateral sepals connate to their apices, together 10–12 mm. long and 8–10 mm. broad, suborbicular-ovate, acute or obtuse, cucullate and gibbous at the base, many-nerved. Petals about 1 mm. long and 1.5 mm. broad, broadly flabellate to transversely oval, the apex much thickened. Lip 0.75–1 mm. long and 1–1.4 mm. broad, about 0.75 mm. thick at the apex, flabellate, truncate, the transverse callus at the apex of the lip, very like the petals but slightly smaller.

Endemic in Panama.

COCLÉ: hills north of El Valle de Antón, alt. 800 m., *Allen 2952*.

Stelis Allenii is perhaps the most distinctive species of the genus in Central America and seems to be the largest-flowered. There are no near allies in Central America but the species seems to belong to Lindley's section DIALISSA, a section with but a few species in the Andes.

2. STELIS INAEQUALIS Ames, Sched. Orch. 4:12. 1923; in Bot. Mus. Leafl. Harv. Univ. 3:155, *t.* 1935.

Small, caespitose, epiphytic herbs up to about 5 cm. tall. Secondary stems about 3 mm. long, concealed by the sheathing bracts. Leaves 1.5–2.5 cm. long and 0.4–0.5 cm. broad, oblanceolate, obtuse, emarginate, coriaceous. Inflorescence up to 5 cm. long, exceeding the leaves; bracts about 1 mm. long, infundibuliform. Dorsal sepal 2–2.5 mm. long and 1–1.4 mm. broad, elliptic-oblong, obtuse, puberulent ventrally. Lateral sepals 1–1.4 mm. long and together 1.6–2 mm. broad, connate to beyond the middle. Petals 0.5–0.75 mm. long and 0.75–1 mm. broad, flabellate. Lip 0.6–0.75 mm. long and about 0.35–0.5 mm. broad, rather thin below the middle and much thickened above, strongly concave in front of the obtuse apex.

Fig. 81

Honduras and Panama.

PANAMÁ: foothills, upper reaches of Chagres River near San Juan, alt. near sea-level, *Powell 271*.

3. STELIS DESPECTANS Schltr. in Fedde Rep. Sp. Nov. 8:453. 1910.

Stelis chiriquensis Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:386. 1918.
Stelis nutantiflora Schltr. loc. cit. 390.

Caespitose epiphytic herbs up to about 25 cm. tall. Secondary stems 2–12 cm. long, about as long as or shorter than the leaves. Leaves narrowed to a petiole at the base; lamina 2–12 cm. long and 2–7 mm. broad, linear-elliptic or linear-oblanceolate; petiole up to 4 cm. long, slender. Inflorescence about as long as or exceeding the leaves in length. Sepals connate at the base for a short distance; dorsal sepal 2–3 mm. long and 0.75–1.5 mm. broad, lanceolate-oblong to obovate-oblong, acute or obtuse; lateral sepals 1.7–2.5 mm. long and 1.2–1.5 mm. broad, ovate, acute or obtuse. Petals 0.5–0.7 mm. long and 0.4–0.5 mm. broad, suborbicular, apex truncate and thickened. Lip 0.6–0.75 mm. long and 0.3–0.6 mm. broad, rhombic to broadly ovate, thickened, excavate and concave in front, the basal half much thickened and the callus submammillate.

Costa Rica and Panama.

CHIRIQUÍ: between Alto de las Palmas and Cerro Horqueta, alt. 2100–2268 m., *Pittier 3228*.

The specimen cited is the largest known for the species and the maximum measurements apply to it.

4. STELIS MICROCHILA Schltr. in Fedde Rep. Sp. Nov. 9:289. 1911.

Stelis barbata Rolfe in Kew Bull. 1913: 141. 1913.
Stelis costaricensis Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:388. 1918.
Stelis cinerea Schltr. loc. cit. 444.
Stelis bryophila Schltr. in Fedde Rep. Sp. Nov. Beih. 19:16. 1923.

Small, caespitose, epiphytic herbs up to about 15 cm. tall. Secondary stems

up to about 2 cm. long, covered with one or more loose sheaths. Leaves 2–6 cm. long and 0.2–0.8 cm. broad, narrowly to broadly oblanceolate, obtuse or acute, attenuated into a narrow petiole at the base. Sepals connate for a short distance at the base, puberulent within and sometimes dorsally; dorsal sepal 1.5–2 mm. long and 1.3–1.5 mm. broad, ovate to suborbicular, obtuse or acutish; lateral sepals 1.2–1.5 mm. long and 1.1–1.3 mm. broad, broadly ovate. Petals about 0.75 mm. long and 0.75–1.1 mm. broad, transversely oblong or subquadrate, the truncate terminal margin thickened. Lip 0.5–0.6 mm. long and 0.25–0.4 mm. broad; basal ½ or ⅔ very fleshy, with two more or less longitudinal calluses or thickenings which have a distinct sinus; terminal lobe oblong or subquadrate, obtuse, cochleate, relatively thin.

Guatemala, Costa Rica, and Panama.

COCLÉ: mountains beyond La Pintada, alt. 400–600 m., *Hunter & Allen 590.*

5. STELIS MONTANA L. Wms. in Ann. Missouri Bot. Gard. 27:272. 1940; loc. cit. 29:340, *t. 32, figs. 9–12.* 1942.

Caespitose epiphytic herbs up to about 33 cm. tall. Secondary stems 11–13 cm. long, covered with the sheathing cauline bracts, shorter than the leaves. Leaves 17–20 cm. long and 3–3.5 cm. broad, oblanceolate, obtuse, coriaceous, gradually narrowed into a short petiole. Inflorescence racemose, as long as or longer than the subtending leaves. Sepals connate for a short distance at their bases. Dorsal sepal about 6 mm. long and 3.5 mm. broad, ovate to lanceolate-ovate, acute, apiculate. Lateral sepals about 5 mm. long and 4.5 mm. broad, broadly ovate, somewhat oblique, acute, apiculate. Petals about 1.5 mm. long and 1.5 broad, nearly orbicular, the apex thickened. Lip about 2–2.25 mm. long and 0.8–1 mm. broad, oblong to oblong-obovate, obscurely 3-lobed, the basal half filled with a large callus, the terminal part thin, minutely puberulent dorsally.

Endemic to Panama.

CHIRIQUÍ: trail from Cerro Punta to headwaters of Río Caldera, alt. 2250–2500 m., *Allen 1463.*

6. STELIS ATRORUBENS L. Wms. in Ann. Missouri Bot. Gard. 29:239. 1942.

Small, caespitose, epiphytic herbs up to about 18 cm. tall. Secondary stems 1.5–3.5 cm. long, slender, covered with bracts. Leaves 6–9 cm. long, petiolate, much longer than the secondary stems; lamina about 4–6.5 cm. long and 0.5–1 cm. broad, elliptic to elliptic-oblanceolate, obtuse, fleshy; petiole 2–3 cm. long. Inflorescence up to 15 cm. long, upper half more or less densely flowered; bracts about 2 mm. long, infundibuliform, acute, scarious. Sepals connate at the base, rotate, 2–2.5 mm. long and 1.5–2 mm. broad, triangular, acute, 3-nerved. Petals about 0.75 mm. long and 0.75 mm. broad, suborbicular, 1-nerved, the terminal part thickened, fleshy. Lip 1–1.5 mm. long and 0.5–0.6 mm. broad, obscurely 3-lobed, oblong or oblong-oval, basal part of the lip oblong, somewhat concave, fleshy, terminating into two small, suberect lateral lobes, terminal lobe of the lip about 0.5 mm. long, suborbicular, strongly concave, fleshy.

Fig. 82. *Stelis atrorubens*

Endemic to Panama.

COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 1234;* hills north of El Valle de Antón, trail to Las Minas, *Allen 2876.*

Allied to the preceding and the following species.

7. STELIS SKUTCHII Ames in Bot. Mus. Leafl. Harv. Univ. 6:17, *t.* 1938.

Caespitose epiphytic herbs up to 3 dm. tall. Secondary stems 6–10 cm. long, slender, covered with scarious sheaths. Leaves petiolate; lamina 5–12 cm. long and 0.8–2 cm. broad, elliptic, obtuse or acutish; petioles 2–4 cm. long, sulcate. Inflorescence up to 22 cm. long, exceeding the subtending leaf; bracts about 2 mm. long, infundibuliform. Sepals connate at the base, papilliferous within; dorsal sepal about 6 mm. long and 2 mm. broad, lanceolate-ovate, apiculate; lateral sepals about 4.5 mm. long and 2 mm. broad, ovate-lanceolate, slightly oblique. Petals about 1 mm. long and about 1.3 mm. broad, flabellate, callus-thickened toward the truncate apex. Lip about 1 mm. long and 0.5 mm. broad, linguiform, with an erect but obscure lobule on each side near the middle, callus-thickened below, terminal part slightly concave above and slightly narrower than the basal portion.

Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, Boquete District, alt. 6000 feet, *Davidson 270.*

Fig. 83. *Stelis Skutchii*

8. STELIS HYMENANTHA Schltr. in Fedde Rep. Sp. Nov. 10. 291. 1912.

Stelis cuspidilabia Schltr. in Fedde Rep. Sp. Nov. Beih. 19:17. 1923.
Stelis seleniglossa Schltr. loc. cit. 97.

Small, caespitose, epiphytic herbs up to about 20 cm. long. Secondary stems 1–5 cm. long, shorter than the leaves. Leaves 4–10 cm. long and 0.2–1 cm. broad, linear, ligulate to oblanceolate, obtuse or acute, coriaceous. Inflorescence up to 13 cm. long, longer than or subequal to the subtending leaves. Sepals 1–1.4 mm. long and 0.75–1.2 mm. broad, broadly oval to suborbicular, obtuse or acute, free almost to their bases. Petals about 0.5 mm. long and 0.25–0.3 mm. broad, oblong, truncate, apex thickened. Lip 0.5–0.7 mm. long and about 0.4 mm. broad, subquadrate to suborbicular-ovate, the apex produced into a broad, acute or acuminate apicule about ⅓ the length of the lip, disc provided with a bipartite callus on the basal half.

Mexico, Guatemala, Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, alt. 6000 feet, *Terry 1286*.

9. STELIS CRESCENTIICOLA Schltr. in Fedde Rep. Sp. Nov. 16:442. 1920; Ames, Sched. Orch. 5:11. 1923; Ames in Bot. Mus. Leafl. Harv. Univ. 3:175, *t.* 1935.

Stelis flexuosa Lindl., sensu Kränzl., in Engl. Bot. Jahrb. 26:450. 1899.
Stelis Isthmii Schltr. in Fedde Rep. Sp. Nov. Beih. 17:16. 1922.
Stelis praemorsa Schltr. loc. cit. 17.

Small, caespitose, epiphytic herbs up to 20 cm. tall. Secondary stems 1–2 cm. long, slender, much shorter than the leaves. Leaves 4–9.5 cm. long and 0.5–1 cm. broad, oblanceolate, acute or obtuse, attenuated into a petiole at the base, coriaceous. Inflorescence up to about 18 cm. long, much exceeding the leaves, raceme densely flowered; bracts 1–2 mm. long, infundibuliform. Sepals 1–1.5 mm. long and 1–1.5 mm. broad, suborbicular to subrhombic-ovate, acute or obtuse, papilliferous within. Petals about 0.5 mm. long and about 0.75 mm. broad, flabellate, not thickened at the apex. Lip about 0.5 mm. long and 0.5 mm. broad and nearly as thick, rhombic-ovate, with a transverse callus through the middle and the short apex incurved.

Costa Rica and Panama.

CANAL ZONE (?): in tidal belt, *Pittier 6595*. PANAMÁ: Río Chagres, *Lehmann 4540*; hills east of [Panamá] City and San Juan, all near sea-level, *Powell 232, 234, 284, 285, 3312, 3313, 3314, 3522*.

The smallest-flowered of the Panamanian species.

10. STELIS LEUCOPOGON Reichb. f. Beitr. Orch. Centr.-Am. 95, *t. 9, figs. 1, 1-4.* 1866.

Stelis cascajalensis Ames, Sched. Orch. 4:11. 1923.
Stelis eximia Ames, loc. cit. 6:54. 1923.

STELIS *crescentiicola Schltr.*

Fig. 84

Caespitose epiphytic herbs up to about 40 cm. tall. Secondary stems 2–15 cm. long, either longer or shorter than the leaves. Leaves 6–15 cm. long and 1–4.5 cm. broad, ligulate, oblanceolate to narrowly oval, acute or obtuse, coriaceous, attenuated into a petiole at the base. Inflorescence up to 30 cm. long, one or more from the apex of each secondary stem, subequal to usually much exceeding the leaves in length. Sepals 4–9 mm. long and 4–8 mm. broad, broadly ovate-triangular to suborbicular, acute or obtuse, puberulent or glabrous within, usually 5-nerved. Petals 0.75–1.3 mm. long and 1.75–2.2 mm. broad, flabellate, truncate apex very fleshy. Lip 0.5–1 mm. long and 0.7–1.2 mm. broad, transversely oblong to suborbicular-quadrate, apiculate or triapiculate at the apex, disc very fleshy, the callus more or less transverse.

Costa Rica and Panama; possibly also in South America.

CHIRIQUÍ: vicinity of Bajo Chorro, alt. 1900 m., *Woodson & Schery 624;* "Caramilla," alt. 4000–6000 feet, *Powell 312, 334.* COCLÉ: hills north of El Valle de Antón, alt. 1000 m., *Allen 2173;* vicinity of La Mesa, north of El Valle de Antón, alt. about 1000 m., *Allen 2301;* north rim, El Valle de Antón, *Alston & Allen 1840.*

A variable species which may include *Stelis Endresii* Reichb. f. The specimens from Coclé differ somewhat from the others in having a triapiculate apex on the lip.

11. STELLIS ENDRESII Reichb. f. in Gard. Chron. 1373. 1870; Ames in Bot. Mus. Leafl. Harv. Univ. 1[9]: *fig. p. 9.* 1933.

Stelis parvibracteata Ames, Orch. 7:131. 1922.

Small, caespitose, epiphytic herbs up to 22 cm. tall. Secondary stems 1.5–5 cm. long, slender, shorter than the leaves. Leaves 4–13 cm. long and 0.5–2 cm. broad, elliptic to oblanceolate, obtuse or acute, attenuated into a petiole at the base. Inflorescence up to 18 cm. long, floriferous to the middle or below, much exceeding the leaves, 1 or more from a stem; bracts 1–2 mm. long, infundibuliform. Sepals 2–4 mm. long and 2–5 mm. broad, suborbicular to subtriangular, acute or obtuse, glabrous to puberulent within, 2-(or rarely 5-) nerved. Petals 0.75–1 mm. long and 1–1.5 mm. broad, flabellate, truncate, apical part thickened and fleshy. Lip about 0.75 long and 1 mm. broad, transversely oval, with a small, erect apicule at the apex.

STELIS *Endresii Reichb.f.*

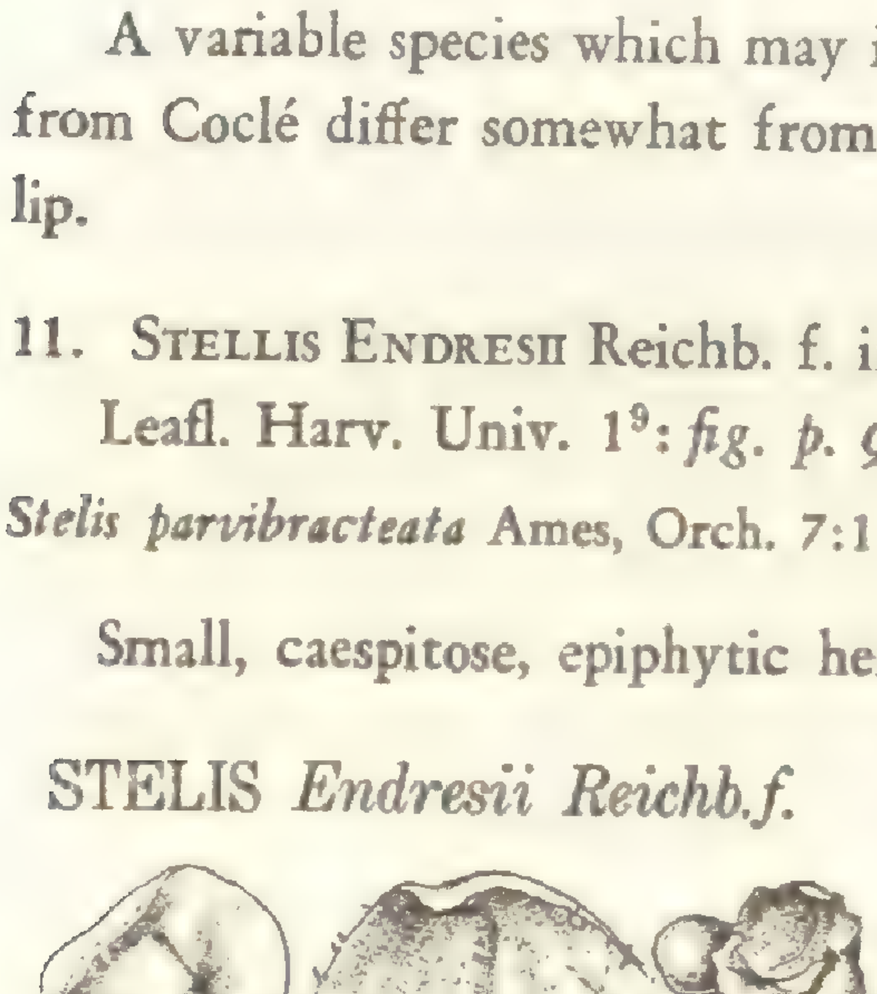


Fig. 85

Mexico, Guatemala, Costa Rica and

Panama, possibly also in South America.

DARIÉN: Cana and vicinity, alt. 6000 feet, *Williams 972*. COCLÉ: hills north of El Valle de Antón, alt. 800–1000 m.. *Allen 2273*.

Critical work on the genus may prove this species to be the same as S. *leucopogon* Reichb. f.

12. STELIS POWELLII Schltr. in Fedde Rep. Sp. Nov. Beih. 17:16. 1922; Ames in Bot. Mus. Leafl. Harv. Univ. 1[9]: *fig. p. 9*. 1933.

STELIS *Powellii Schltr.*

Fig. 86

Small, caespitose, epiphytic herbs up to 15 cm. tall. Secondary stems 1–3 cm. long, shorter than the leaves. Leaves attenuated into a petiole at the base; lamina 2–7 cm. long and 0.5–1.5 cm. broad, oblanceolate to ligulate-oblanceolate, obtuse; petiole up to 3 cm. long. Inflorescence longer than the leaves; bracts 2–4 mm. long, ovate, acute, large and conspicuous for the genus, infundibuliform. Sepals 2.5–3 mm. long and 3–3.5 mm. broad, connate for a short distance at the base, suborbicular to ovate-suborbicular or ovate-triangular, obtuse, 5-nerved, puberulent or papillose within. Petals 1–1.5 mm. long and 1.5–2 mm. broad, flabellate, subtruncate and thickened terminally. Lip 1.2–1.5 mm. long and 0.75–1.2 mm. broad, ovate, concave, relatively thin with a cruciform callus in the middle.

Costa Rica and Panama.

CHIRIQUÍ: alt. 4000 feet, *Powell 247*.

Conspicuous among Panamanian species by the relatively conspicuous bracts.

13. STELIS STORKII Ames in Bot. Mus. Leafl. Harv. Univ. 3:54, *fig.* 1935; L. Wms. in Ann. Missouri Bot. Gard. 27:273. 1940.

Small, caespitose, epiphytic herbs up to 6 cm. tall. Secondary stems 1–2 cm. long, covered with sheathing bracts, shorter than the leaves. Leaves 1–4 cm. long and 0.25–0.5 cm. broad, oblanceolate, acute or obtuse, inconspicuously marginate, longer than the secondary stems, equal to or usually shorter than the inflorescence. Inflorescence up to about 4 cm. long; bracts 1–1.5 mm. long, infundibuliform, apiculate. Sepals connate for a short distance at their bases, 1–1.3 mm. long and 1–1.3 mm. broad, nearly orbicular, obtuse, 3-nerved. Petals 0.5–0.75 mm. long and about 0.6 mm. broad, broadly obovate or cuneate

flabellate, slightly cochleate, the apex thickened. Lip about 0.5–0.75 mm. long and as broad, nearly orbicular, fleshy, with a large central callus extending through the middle of the lamina and prominently raised at the base.

Costa Rica and Panama.

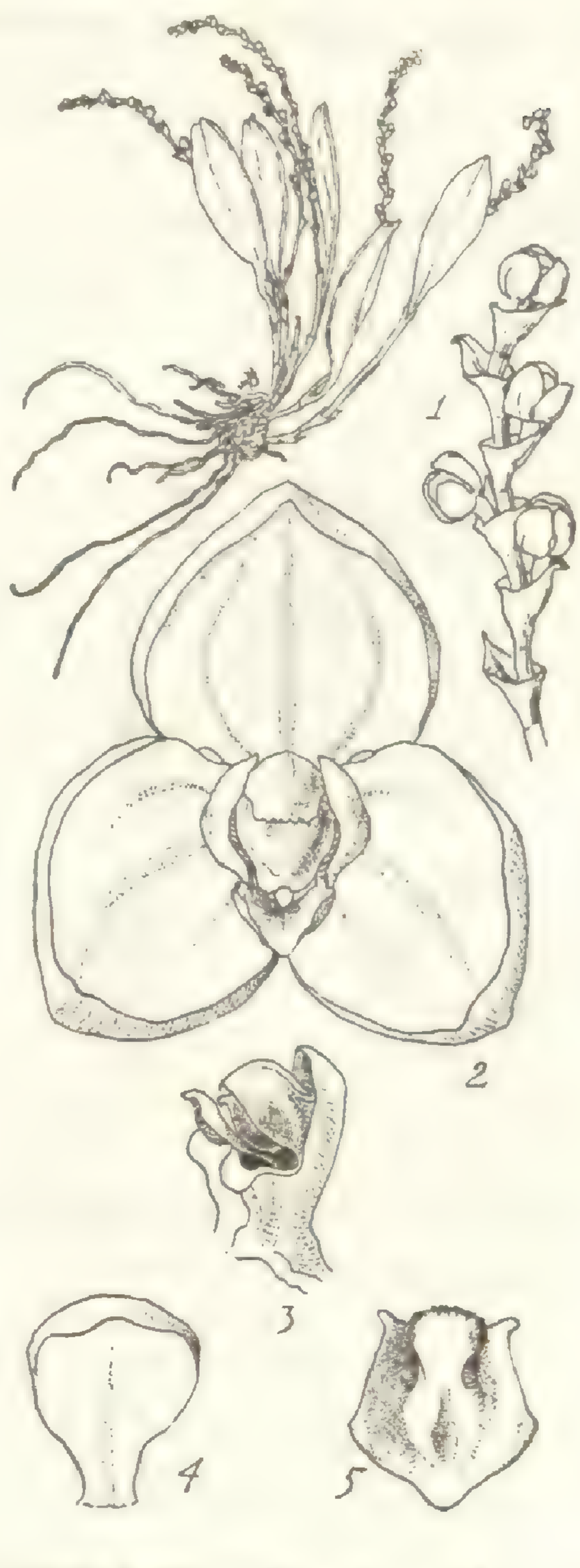
COCLÉ: vicinity of El Valle, alt. 800–1000 m., *Allen 1828.*

14. STELIS MAXONII Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:389. 1918.

Caespitose epiphytic herbs up to 40 cm. tall. Secondary stems up to 23 cm. long, slender. Leaves 9–15 cm. long and 1–2.7 cm. broad, elliptic to lanceolate, obtuse, coriaceous, attenuated into a short petiole at the base. Inflorescence up to about 15 cm. long, subequal to the leaves; bracts about 3 mm. long, infundibuliform, acute or shortly acuminate. Sepals 2–3 mm. long and 2.2–3.5 mm. broad, suborbicular. Petals about 1 mm. long and 1 mm. broad, suborbicular, flabellate, the terminal part thickened and fleshy. Lip about 1.2 mm. long and 1 mm. broad, broadly oval in outline, with a transverse callus across the middle of the lip, the lip fleshy.

Costa Rica and Panama.

CHIRIQUÍ: Volcán de Chiriquí, alt. 10,000 feet, *Davidson 988;* above El Boquete, alt. 1450–1650 m., *Maxon 5697;* southern slope of La Horqueta, alt. 1700–2100 m., *Pittier 3242.*



STELIS *Storkii* Ames

Fig. 87

Closely allied to S. *thecoglossa* Reichb. f. with which it has been placed.

15. STELIS PANAMENSIS Schltr. in Beih. Bot. Centralbl. 37, Abt. 2:391. 1918.

Erect epiphytic herbs up to 18 cm. tall. Secondary stems 2–3 cm. long, much shorter than the leaves. Leaves 8–10 cm. long and 0.8–1 cm. broad, oblanceolate-ligulate, obtuse, narrowed to a petiole at the base. Inflorescence equal to the leaves or shorter; bracts cucullate. Sepals broadly ovate, obtuse; dorsal sepal about 2.5 mm. long; the lateral sepals distinctly smaller, oblique. Petals broadly rhombic-reniform, oblique, obtuse, apex thickened. Lip subequal to the petals, reniform, obtuse, excavated at the base and the middle with a transverse callus.

Panama.

PANAMÁ: forests of the upper Mamoni River, alt. 150–400 m., *Pittier 4490*.

This species is known to us only by the description and an analysis of the type.

STELIS *vestita Ames*

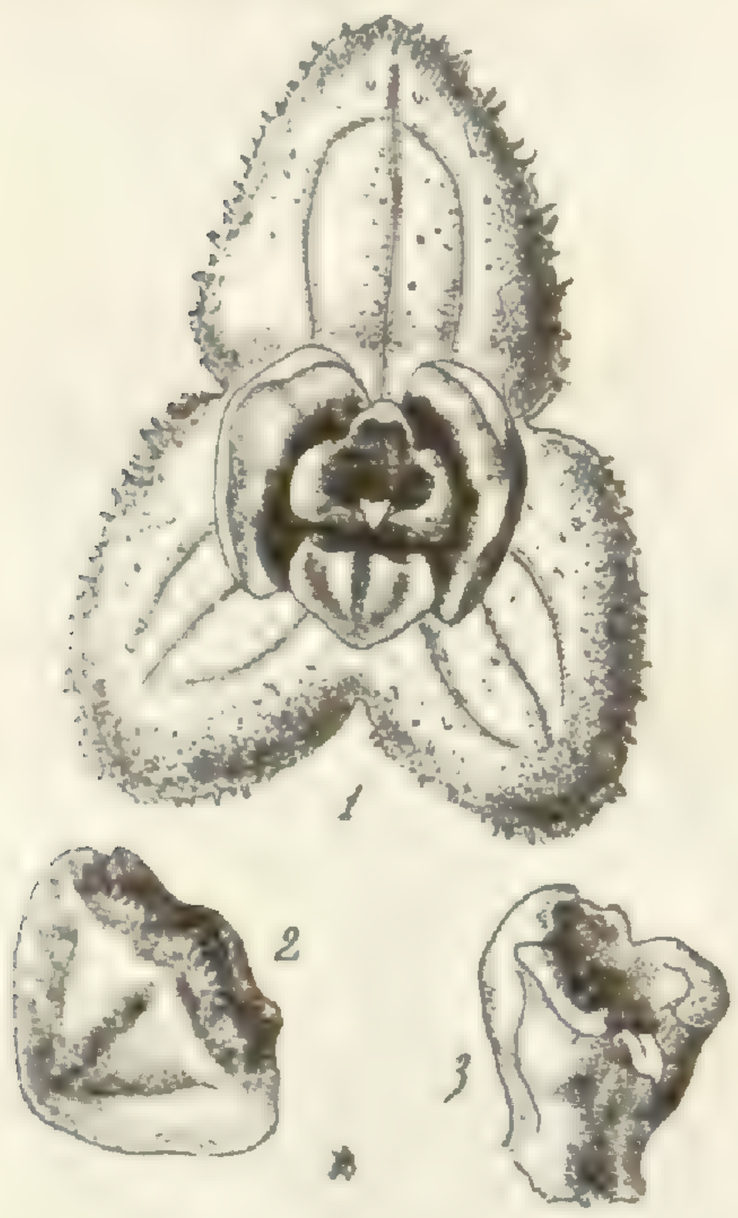


Fig. 88

16. STELIS VESTITA Ames, Sched. Orch. 6:56. 1923; in Bot. Mus. Leafl. Harv. Univ. 1[9]: *fig. p. 9.* 1933.

Caespitose epiphytic herbs up to 45 cm. tall. Secondary stems 4–10 cm. long, subequal or shorter than the leaves. Leaves 5–16 cm. long and 1–2 cm. broad, elliptic-oblong to oblanceolate, attenuated into a petiole at the base, coriaceous. Inflorescence up to about 35 cm. long, much longer than the subtending leaf; bracts 2–3 mm. long, infundibuliform. Sepals 2–2.5 mm. long and 2–2.3 mm. broad, ovate to suborbicular, obtuse, densely glandular-pubescent within. Petals 0.8–1 mm. long and 1.5–1.75 mm. broad, cuneate-flabellate, fleshy, truncate. Lip 0.8–1 mm. long and 1–1.2 mm. broad, suborbicular or transversely subrhombic, callus-thickened in the middle and the basal part with a smaller spongy callus, the margins of the lip thin.

Costa Rica and Panama.

CHIRIQUÍ: Boquete, alt. 4000 feet, *Davidson 696*.

Allied to S. *Endresii* Reichb. f. and to S. *leucopogon* Reichb. f.

17. STELIS AEMULA Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:385. 1918. *Stelis sarcodantha* Schltr. loc. cit. 392.

Small, caespitose, epiphytic herbs up to about 2.5 cm. tall. Secondary stems 1.5–7.5 cm. long, slender, shorter than the leaves. Leaves 4–11.5 cm. long and 0.5–1.3 cm. broad, ligulate to oblanceolate, obtuse or acute, coriaceous, attenuate at the base into a petiole. Inflorescence up to 20 cm. long (in Panama mostly 12 cm. or less), much exceeding the leaves; bracts 1–2 mm. long, infundibuliform. Sepals 1.5–2.2 mm. long and 1.75–2.5 mm. broad, broadly ovate-orbicular or suborbicular, obtuse or acutish, marginate or the margins obscurely involute, puberulent or glabrous within. Petals 0.5–0.6 mm. long and 0.6–1 mm. broad, oblong to flabellate, the apex thickened. Lip 0.5–0.75 mm. long and 0.6–1 mm. broad, suborbicular, obtuse, with a transverse callus in the middle, margins not thickened.

(Guatemala, Honduras — S. *perplexa* Ames)?, Costa Rica, and Panama.

CHIRIQUÍ: Palo Alto, alt. 4500–5000 feet, *Powell 290, 291, 293, 294.* COCLÉ: hills north of El Valle de Antón, alt. 1000 m., *Allen 2154, 2157.*

18. STELIS COLLINA Schltr. in Fedde Rep. Sp. Nov. Beih. 17:15. 1922.

Small, caespitose, epiphytic herbs up to 28 cm. long. Secondary stems up to 3 cm. long, slender. Leaves 3–10 cm. long and 0.7–1.2 cm. broad, oblanceolate-ligulate, obtuse, attenuated into a petiole at the base. Inflorescence elongated, much exceeding the leaves; bracts about 2 mm. long, infundibuliform. Sepals 3–3.5 mm. long and 3–3.5 mm. broad, triangular-ovate, obtuse, 3-nerved. Petals about 1 mm. long and 1.5 mm. broad, flabellate, truncate apex thickened. Lip about 0.8 mm. long and 1 mm. broad, suborbicular, obtuse, with a transverse raised callus in the middle, the basal half with two lateral cavities and a small longitudinal ridge between them.

Panama.

PANAMÁ: foot-hills near [Panamá] City, near sea-level, *Powell 180.*

Formery referred to *S. Williamsii* Ames, but probably distinct, though closely allied.

19. STELIS WILLIAMSII Ames, Orch. 7:133. 1922.

Small, caespitose, epiphytic herbs up to 25 cm. tall. Secondary stems about 1.5 cm. long. Leaves 4–10 cm. long and 0.6–1.1 cm. broad, attenuated into a short petiole at the base, oblanceolate-ligulate. Inflorescence up to 23 cm. long, much exceeding the leaves; bracts 2–5 mm. long, infundibuliform, free part triangular-lanceolate or broadly ovate, acute or acuminate. Sepals about 3.5–4.5 mm. long and as broad, suborbicular, obtuse. Petals about 1.5 mm. long and 1.7 mm. broad, cuneate-flabellate. Lip about 1 mm. long and 1.2 mm. broad, trulliform, obtuse, with a raised transverse callus.

Panama.

DARIÉN: Cana and vicinity, alt. 6000 feet, *Williams 970.*

Has been confused with S. *collina* Schltr., a closely allied sea-level species.

20. STELIS LONGIPETIOLATA Ames, Sched. Orch. 1:6. 1922.

Small, caespitose, epiphytic herbs up to 10 cm. tall. Leaves 4.5–8 cm. long and 0.7–1.1 cm. broad, elliptic, petiolate, the lamina up to 5.5 cm. long. Secondary stems 1.5–2.5 cm. long, slender, much shorter than the leaves. Inflorescence about equalling the leaves in length; bracts about 1.5 mm. long, infundibuliform. Sepals 2–2.5 mm. long, rotate, deltoid-ovate. Petals about 1 mm. long, ovate to suborbicular, thickened nearly to the base, abruptly excavated below the thickening, apex obscurely and minutely papillose. Lip about 0.75 mm. long and 1.5 mm. broad, reniform, very fleshy, somewhat concave above with a prominent and obscurely bilobed callus in the middle, the sides of which are decurrent laterally

and form a transverse ridge.

Panama.

CHIRIQUI: humid forest between Alto de las Palmas and Cerro de la Horqueta, alt. 2100–2200 m., *Maxon 5460*.

17. PHYSOSIPHON Lindl.

PHYSOSIPHON Lindl. in Bot. Reg. 21: sub *t. 1797*. 1836.

Small, caespitose, epiphytic herbs. Secondary stems slender, terminated by a single leaf. Sepals connate at the base into an (usually) inflated tube, free above, erect or spreading, not caudate. Petals very small in comparison to the sepals. Lip small, articulated to the column-foot, entire or three-lobed. Anther terminal, incumbent, operculate; pollinia 2, ceraceous.

A small genus of rather diverse species, of which the Panama one is not typical of the genus.

1. PHYSOSIPHON MINUTIFLORUS Ames & Schweinf. Sched. Orch. 8:11, *t. 22, figs. 1-6 and habit*. 1925.

Small caespitose epiphytic herbs up to 30 cm. tall. Secondary stems 2–10 cm. long, invested by 2–3 loose sheaths. Leaves 3.5–12 cm. long and 0.5–1.5 cm. broad, oblong-ligulate, coriaceous, attenuated at the base into a petiole. Inflorescence up to 25 cm. long, equalling or exceeding the leaves, densely flowered almost to the base; bracts 2–3 mm. long, infundibuliform. Sepals connate into a short tube at the base, 2–3 mm. long and about 0.6–0.8 mm. broad, free portion ovate-lanceolate, acute or obtuse. Petals about 0.75 mm. long and about 0.2 mm. broad, lanceolate, acute or obtuse. Lip about 0.75 mm. long and 0.75 mm. broad, ovate-quadrate to suborbicular, apiculate.

Costa Rica and Panama; possibly Honduras.

CHIRIQUI: Cerro Vaca, alt. 900–1136 m., *Pittier 5340*; "Caramillo," alt. 5000 feet, *Powell 345*.

18. CRYPTOPHORANTHUS Barb. Rodr.

CRYPTOPHORANTHUS Barb. Rodr. Gen. & Sp. Orch. Nov. 2:79. 1882; Kränzl. in Fedde Rep. Sp. Nov. Beih. 34:220-232. 1925.

Small epiphytic herbs, the secondary stem terminated by a single leaf. Inflorescence short, 1-flowered or with a fascicle of flowers. Sepals connate at the base and at the apices, leaving an opening ("window") on either side between the dorsal and lateral sepals, the lateral sepals forming a mentum at the base. Petals small in comparison to the sepals. Lip free, simple, obscurely lobed or hastate, with two parallel lamellae, subequal to the petals in length. Column small, terete, erect or arcuate, produced into a short foot at the base. Anther terminal, operculate, incumbent; pollinia 2, ceraceous.

Fig. 89. *Physosiphon minutiflorus*

A small genus closely allied to *Masdevallia* and *Pleurothallis*. There are three or four species in Costa Rica and one in Panama.

1. CRYPTOPHORANTHUS LEPIDOTUS L. Wms. in Ann. Missouri Bot. Gard. 29:340, *t. 30, figs. 4-5.* 1942.

Caespitose epiphytic herbs up to about 17 cm. tall. Secondary stems 2–7 cm. long and 1–2 mm. in diameter, covered with 4–5 pergameneous, infundibuliform sheaths which soon disentegrate. Leaves oblanceolate to narrowly obovate, obtuse or acutish, coriaceous, contracted into a distinct petiole; lamina 3.5–10 cm. long; petiole 1–2 cm. long, conduplicate. Inflorescence consisting of 1–6 long-pedunculate flowers at the apex of the secondary stem; the peduncle with 1–3 short infundibuliform sheaths. Sepals joined together at the base and at the tip, leaving

Fig. 90. *Cryptophoranthus lepidotus*

a small opening between the dorsal and lateral ones; dorsal sepal about 15–20 mm. long and 6–7 mm. broad, oblong-lanceolate, strongly cucullate, fleshy, 7-nerved, ridged dorsally and the ridges verrucose; lateral sepals connate to their apices, about 12–18 mm. long and together 6–8 mm. broad, fleshy, each about 7-nerved, with verrucose ridges dorsally. Petals 5–6 mm. long and 2.5–3.5 mm. broad, broadly ovate-lanceolate, acute or acuminate, 3-(5-)nerved. Lip 5–6 mm. long, hastate, unguiculate; lamina about 4 mm. long, 1.5–2 mm. broad, 3-nerved, verrucose or lepidote, with two longitudinal, lamellate calluses extending from the auricles to about the middle; auricles about 1 mm. long, retrorse, subulate; claw 1.5–2 mm. long and 1–1.5 mm. broad, verrucose-scurfy or lepidote toward

its apex. Column of the genus.

COCLÉ: trail to Las Minas, hills north of El Valle de Antón, alt. about 1000 m., *Allen 2718*.

19. MASDEVALLIA Ruiz & Pavon

MASDEVALLIA Ruiz & Pavon, Fl. Peruv. & Chil. Prodr. ed. 1, 122. 1794; ed. 2, 110, *t. 27*. 1797; Woolward, Genus Masdevallia. 1896; Kränzl. in Fedde Rep. Sp. Nov. Beih. 34:1-202. 1925.

Caespitose or repent, epiphytic or terrestrial herbs. Secondary stems usually very short, bearing a single leaf and a peduncle or the leaves and peduncles borne on separate stems. Leaves most often broadest toward the apex and attenuated into a petiole at the base, with an abscission at the end of the secondary stem and another slightly above. Peduncles usually 1- to 2-flowered. Sepals connate into a tube at the base or to the middle or beyond, the free portions often spreading, the tips usually developed into slender tails, produced into a mentum at the base. Petals very much smaller than the sepals, usually narrow. Lip small, articulated to the column-foot, about as long as the column. Column erect, produced into a column-foot at the base; margins of the clinandrium usually membranaceous and denticulate. Anther terminal, operculate, incumbent; pollinia 2, ceraceous.

A large and complex genus of some 250 species. The species are most abundant in cool mountain regions of the tropics of the New World. The genus was once very popular with orchid fanciers, some of the rarer or more beautiful species commanding fabulous prices.

Masdevallia connects to the genus *Pleurothallis* at several points, notably through such species as M. *Allenii* L. Wms., which differs but slightly from the species of Schlechter's *Barbosella* (previously reduced to *Pleurothallis*). *Scaphosepalum* has several species which are "connecting links" between *Masdevallia* and *Pleurothallis*. Lindley's genus *Restrepia*, which I have reduced to *Pleurothallis*, contains some intermediate species between *Pleurothallis* and *Masdevallia*, and if *Restrepia* were to be maintained as a genus most of the species which were referred to *Barbosella* and many of the species of *Masdevallia* § *Triaristella* (M. *triaristella* Reichb. f., M. *Allenii* L. Wms., etc.) should be placed there. There is little or no technical reason why *Pleurothallis* (and *Stelis* too) should not be reduced to *Masdevallia*, but it would serve no practical purpose to do so. *Pleurothallis* and *Masdevallia* are both large and technical and *most* of the species can be placed in the proper genus readily.

a. Tails of the lateral sepals originating below the apex ..... 8. M. ALLENII
aa. Tails of the lateral sepals, if present, terminal.
  b. Lateral sepals with transverse calluses at the base ..... 7. M. SIMULA
  bb. Lateral sepals without transverse calluses at the base.
    c. Callus at the base of the petal free and appearing to be a cauda .... 1. M. COLLINA
    cc. Callus lacking at the base of the petal, or if present not free.
      d. Lip less than 2.5 mm. long ..... 6. M. TENUISSIMA
      dd. Lip more than 2.5 mm. long.

e. Dorsal sepal prolonged into a subfiliform tail.
f. Peduncle usually 2-flowered, about as long as the leaves or longer; lip up to 4 mm. long ..... 3. M. CHONTALENSIS
ff. Peduncle 1-flowered, always shorter than the leaves; lip more than 4 mm. long ..... 2. M. ATTENUATA
ee. Dorsal sepal either without tails, or with tails not filiform.
f. Free part of the dorsal sepal lanceolate or lanceolate-ovate, erect ..... 4. M. ECAUDATA
ff. Free part of the dorsal sepal ligulate or lanceolate-ligulate, recurved ..... 5. M. LIVINGSTONEANA

1. MASDEVALLIA COLLINA L. Wms. in Am. Orchid Soc. Bull. 11:93, *t. 3.* 1942.

Small caespitose epiphytic herbs up to 15 cm. tall. Secondary stems very short, bearing a leaf and an inflorescence. Leaves 6–9 cm. long and 1.1–1.5 cm. broad, oblanceolate, obtuse, attenuated into a petiole at the base, coriaceous, 3-nerved. Inflorescence slender, (1?–)2-flowered, peduncle much exceeding the leaves. Sepals about 25 mm. long, connate into a tube for about ½ their length; tube 11–14 mm. long, free part of the sepals 9–14 mm. long, consisting of subfiliform caudae from a very short free lamina. Petals about 4 mm. long and 1.5 mm. broad, linear-oblong, truncate and tridentate at the apex, 1-nerved, with an elongated, sublamellate callus which extends from near the base to near the apex along the anterior margin; another callus begins near the base and extends to and off at the base forming a free, curved, cauda-like process, the free part about 1 mm. long. Lip about 6 mm. long and 2 mm. broad, linear-oblong, truncate and retuse at the base, the apex rounded, somewhat dilated and ciliate, fleshy, somewhat canaliculate, keeled on the mid-nerve below.

Panama.

COCLÉ: hills north of El Valle de Antón, alt. about 1000 m., *Allen 2158.*

2. MASDEVALLIA ATTENUATA Reichb. f. in Gard. Chron. 834. 1871; Woolw. Genus Masdevallia *t.* [*35*]. 1896; Hook. f. in Bot. Mag. 33: *t. 6273.* 1877.

Masdevallia Laucheana Kränzl. ms. ex Woolw. loc. cit. *t.* [*19*]; Kränzl. in Fedde Rep. Sp. Nov. Beih. 34:166. 1925.

Small, caespitose, epiphytic herbs up to about 15 cm. tall. Secondary stems very short. Leaves 5–13 cm. long and 0.5–1.8 cm. broad, linear-oblanceolate to oblanceolate, acute or obtuse, attenuated into a petiole at the base. Inflorescence 1-flowered; peduncles slender, shorter than the leaves. Sepals 18–22 mm. long, connate into a tube for about ⅓ their length, the caudate apices about as long as the broad part of the sepals, puberulent within, the broad, free part of the sepals oblong-ovate to triangular-ovate. Petals 3.5–5 mm. long and 1.2 mm. broad, subrhombic to oblong-lanceolate, acute, somewhat oblique, with a longitudinal callus along one margin. Lip 4.2–5 mm. long and 1.5–2 mm. broad, oblong-lanceolate to oblong-pandurate, obtuse or acute, apical portion denticulate, with two longitudinal keels which converge toward the apex.

Costa Rica and Panama.

CHIRIQUÍ: Boquete, alt. about 1360 m., *Davidson 1271;* "Chiriquí," *Pfau;* "Cerro Horconcito," alt. about 1360 m., *Powell 268.*

Fig. 91. *Masdevallia collina*

Possibly the original collection of this species was from Chiriquí *(Pfau)*, Powell's collection differs slightly from the others. The species is rare and more specimens are desired for study.

3. Masdevallia chontalensis Reichb. f. in Otia Bot. Hamb. 1:274. 1878; L. Wms. in Ann. Missouri Bot. Gard. 27:274. 1940.

Masdevallia diantha Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:384. 1918.

Small, caespitose, epiphytic herbs up to about 11 cm. tall. Secondary stems up to about 2 mm. long. Leaves 2–9 cm. long and 0.2–0.8 cm. broad, oblanceolate to linear-oblanceolate, acute or obtuse, attenuated into a petiole at the base. Inflorescence 1- or usually 2-flowered; peduncles from almost as long as the leaves to twice as long. Sepals 9–18 mm. long, connate into a tube for about ½ or ⅗ their length, the free part ovate to ovate-lanceolate and caudate. Petals 2.5–3.5 mm. long and 0.7–1.2 mm. broad, linear-oblong to oblong-lanceolate, apex tridentate, truncate or obtuse, with a small lateral callus extending from about the middle toward the apex. Lip 2.8–4 mm. long and 0.9–1.7 mm. broad, oblong-oblanceolate to oblong-obovate, biauriculate at the base, with two longitudinal callus-ridges extending from the base nearly to the apex where they converge, dilated apical part denticulate.

Nicaragua, Costa Rica and Panama.

coclé: vicinity of El Valle, alt. 600–1000 m., *Allen 1231;* vicinity of El Valle, north rim, alt. 800–1000 m., *Allen 1826;* trail to Las Minas, El Valle de Antón, alt. 1000 m., *Allen 2876.*

4. Masdevallia ecaudata Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:384. 1918; L. Wms. in Ann. Missouri Bot. Gard. 27:274. 1940.

Small, caespitose, epiphytic herbs up to about 12 cm. tall. Secondary stem short, 2–10 mm. long. Leaves 3–9 cm. long and 0.6–1.1 cm. broad, oblanceolate, obtuse, coriaceous, attenuated into a petiole at the base. Inflorescence about as long as or exceeding the leaves, 1-flowered, the peduncle slender. Sepals puberulent within, about 15–22 mm. long, connate into a tube about ⅔ of their length, the free parts lanceolate to ovate-lanceolate, acute or acuminate, usually ecaudate but sometimes caudate, the apices thickened. Petals 5–8 mm. long and 1.5–3.5 mm. broad, oblong-ovate, short-unguiculate, usually angled on one side. Lip 6.5–9 mm. long and 2–3.5 mm. broad, oblong-lanceolate, auriculate at the base, disc with a pair of longitudinal fleshy calli.

Costa Rica and Panama.

chiriquí: valley of the upper Río Chiriquí Viejo, *White & White 81.*

Very closely allied to *M. Livingstoneana*, from which it differs mainly in having slightly different sepals and petals and a larger lip.

5. Masdevallia Livingstoneana Reichb. f. in Gard. Chron. II, 2:322. 1874; Ames, Sched. Orch. 5:9, *fig. 2.* 1923.

Scaphosepalum panamense Schltr. in Fedde Rep. Sp. Nov. 12:205. 1913.
Masdevallia panamensis Ames, Sched. Orch. 4:9. 1923.

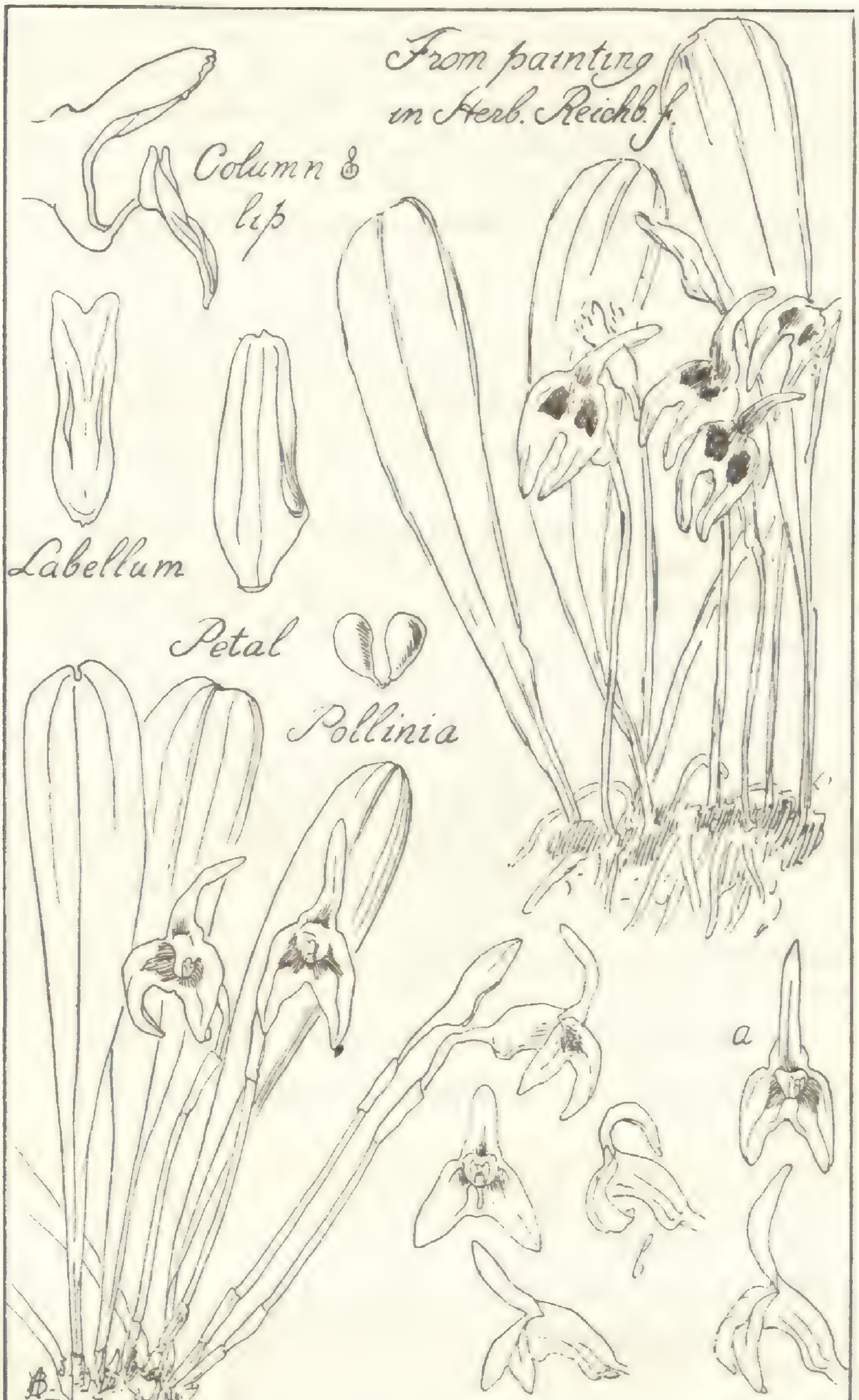


Fig. 92. *Masdevallia Livingstoneana*

Small, caespitose, epiphytic herbs up to 13 cm. tall. Secondary stems short. Inflorescence 1-flowered, peduncle shorter than the leaves. Sepals 15–20 mm. long, connate into a tube for about ½ their length; free portion of dorsal sepal up to 12 mm. long and 3 mm. broad at the base, ligulate or lanceolate-ligulate,

somewhat thickened and fleshy toward the apex; free part of the lateral sepals up to 12 mm. long and 5 mm. broad, lanceolate-triangular, arcuate, acute or obtuse. Petals 4.5–5 mm. long and 1.5–2 mm. broad, oblong, obtuse, with a single longitudinal sublamellate callus extending from below the middle to the apex. Lip 4–6 mm. long and 1–1.2 mm. broad, oblong to oblong-lanceolate, acute or obtuse, sometimes more or less pandurate, the disc thickened and with two raised, longitudinal calli.

Costa Rica (?) and Panama.

CANAL ZONE: forest along Río Indio de Gatún, alt. near sea-level, *Pittier 2803*; west of canal near village of Arrajáan, alt. near sea-level, *Powell 223*. PANAMÁ: foothills east of Panama City and San Juan, alt. near sea-level, *Powell 273, 411, 3282, 3287*.

6. MASDEVALLIA TENUISSIMA C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 4:111. 1937.

Small, caespitose, epiphytic herbs up to about 3 cm. tall. Secondary stems very short, up to about 1 mm. long. Leaves 1–2.2 cm. long and 1–2.5 mm. broad, linear-oblanceolate, obtuse or acute, attenuated into a narrow petiole at the base. Inflorescence up to 3 cm. long, exceeding the leaves; scape filiform. Sepals connate into a tube at the base; dorsal sepal about 6 mm. long and 2.5 mm. broad, caudate, the lamina about 2.5 mm. long and as broad, suborbicular. Lateral sepals about 7.5 mm. long and each about 1 mm. broad, caudate, free part of lamina lanceolate. Petals about 2 mm. long and about 0.75 mm. broad, oblong-lanceolate, subtruncate, triapiculate. Lip about 2 mm. long and 0.7 mm. broad, oblong-lanceolate, obtuse, with 2 inconspicuous, submarginal, lamellate calli extending from the base to the middle, shortly bicaudate at the base, the caudae about 0.2 mm. long. Ovary inconspicuously muricate on the angles.

Panama.

COCLÉ: mountains beyond La Pintada, alt. 400–600 m., *Hunter & Allen 587*.

Masdevallia pygmaea Kränzl. will possibly include this species when the type can be studied.

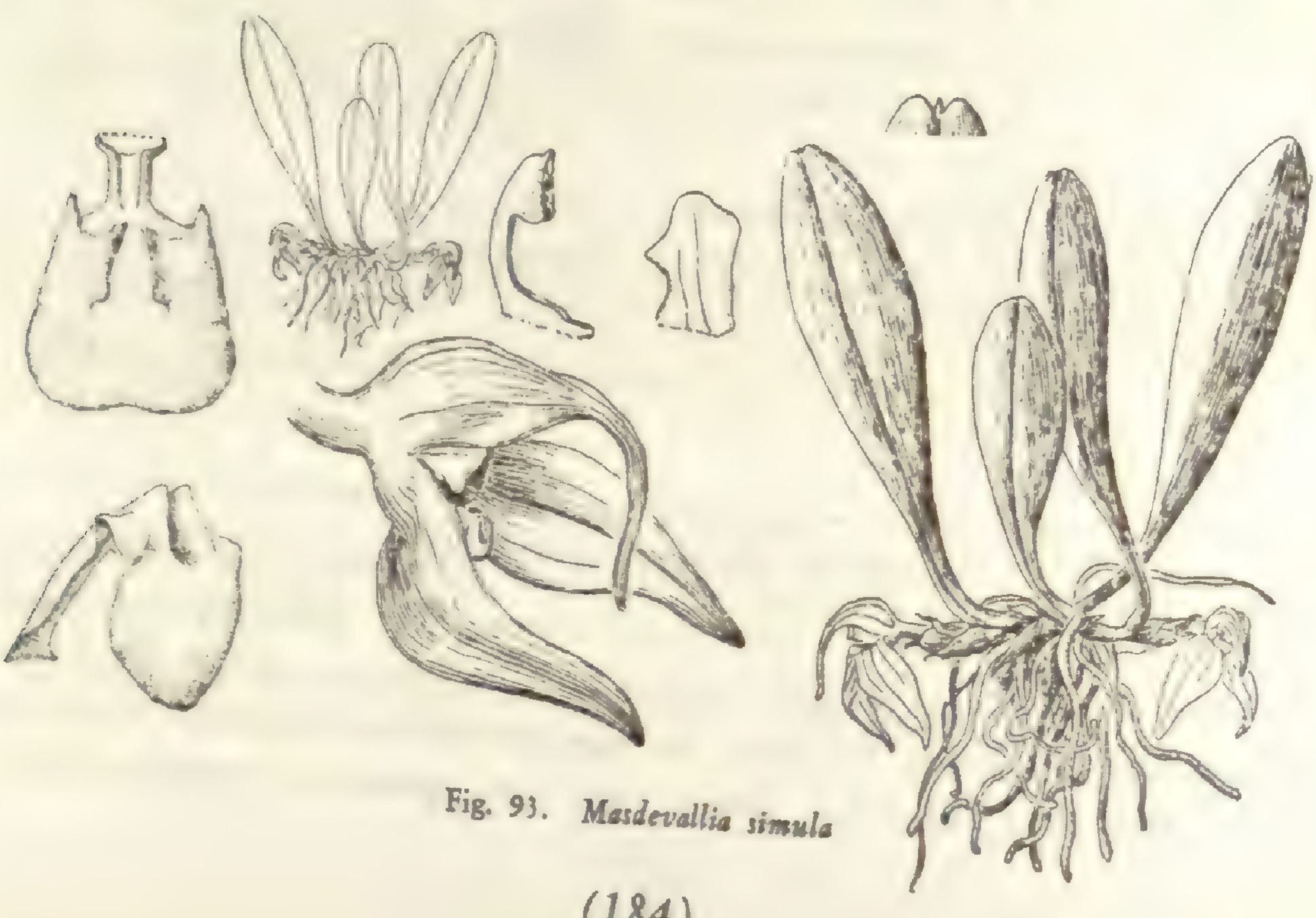


Fig. 93. *Masdevallia simula*

7. MASDEVALLIA SIMULA Reichb. f. in Gard. Chron. n. s. 3:8. 1875; Woolw. Genus Masdevallia, *t.* [*71*]. 1890; L. Wms. in Ann. Missouri Bot. Gard. 27:274, *pl. 31, figs. 1-8.* 1940.

Small caespitose or repent epiphytic herbs up to about 9 cm. tall. Secondary stems up to about 1 mm. long. Leaves 1–10 cm. long and 0.2–0.5 cm. broad, linear to oblanceolate, attenuated into a petiole at the base. Inflorescences 1–3-flowered, much shorter than the leaves. Sepals connate for only a short distance at the base; dorsal sepal 3.5–9 mm. long and 2–4 mm. broad, lanceolate to ovate-lanceolate or triangular-lanceolate, acute, acuminate or caudate; lateral sepals similar to the dorsal except usually somewhat falcate and each provided with a transverse, semi-lunate callus at the base. Petals 1.5–3 mm. long and 1.5–3 mm. broad, subquadrate or subrhombic, angulate. Lip 2–3.5 mm. long and 1.2–3 mm. broad, unguiculate; lamina subquadrate to subquadrate-obovate, biauriculate at the base, with two lamellate calli near the junction with the claw.

Guatemala, Honduras, Costa Rica, Panama, Colombia, and Ecuador.

CANAL ZONE: in tops of high trees, Quebrada Lopez, alt. about 30 m., *Allen 2115.*

Fig. 94. *Masdevallia Allenii*

Masdevallia simula is quite a diverse species in Central America and may prove to be either an aggregate or a polymorphic. It is not a typical *Masdevallia* and might almost as well be placed in *Pleurothallis.* The forms M. *guatemalensis* Schltr. and M. *linearifolia* Ames are included in the description.

8. MASDEVALLIA ALLENII L. Wms. in Ann. Missouri Bot. Gard. 27:273, *pl. 31, figs. 12-16.* 1940.

Small caespitose epiphytic herbs up to about 5 cm. tall. Secondary stems about 3 mm. long, covered with white chartaceous sheaths. Leaves 10–20 mm. long and up to 2 mm. broad, linear, acute, coriaceous, subterete and canaliculate. Inflorescence 1-flowered, longer than the leaves; peduncle about 3–4 cm. long. Sepals forming a short tube at the base; lamina of the dorsal sepal 2.5–3 mm. long and 3–3.5 mm. broad, free portion of the lamina triangular, long-caudate, the cauda filiform and about 10 mm. long; lateral sepals 12–15 mm. long, connate to their apices or nearly so, the lamina lanceolate, with a lateral, filiform appendage about 5–6 mm. long near the apex on either

side. Petals 1.5–2 mm. long and about 0.75 mm. broad, oblong, obtuse. Lip about 3 mm. long and 1 mm. broad, lanceolate or lanceolate-oblong, obtuse, bicaudate at the base; the lamina with two longitudinal calli.

Panama.

COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 1230.*

20. SCAPHOSEPALUM Pfitzer

SCAPHOSEPALUM Pfitz. in Engler & Prantl, Nat. Pflanzenfam. 2^6:139. 1888; Kränzl. in Fedde Rep. Sp. Nov. Beih. 34:204-219. 1925.

Caespitose or repent epiphytic or terrestrial herbs. Secondary stems very short, unifoliate. Leaves mostly broadest near the apex and attenuated into a petiole at the base. Inflorescence a distichous raceme. Sepals connate at the bases; the dorsal sepal free or nearly so, sometimes caudate; lateral sepals more or less united, usually forming a cymbiform synsepal, often callus-thickened near the apices, the apices often attenuated into tails. Petals much shorter than the sepals. Lip small, articulated to the column-foot. Column erect, produced into a foot at the base; margins of the clinandrium membranaceous and denticulate. Anther terminal, operculate, incumbent; pollinia 2, ceraceous.

Scaphosepalum is hardly distinct from *Masdevallia*. The one Panamanian species might well be placed in *Pleurothallis*.

1. SCAPHOSEPALUM ELASMOTOPUS Schltr. in Fedde Rep. Sp. Nov. 12:204. 1913. *Scaphosepalum longirepens* Ames in Proc. Biol. Soc. Wash. 34:153. 1921.

Small, repent, epiphytic herbs. Rhizome elongated. Secondary stems short, up to about 5 mm. long, bearing a leaf or a leaf and a peduncle, with an additional abscission layer in the petiole above the apex of the secondary stem. Leaves 7.5–15 cm. long and 0.7–1.4 cm. broad, oblanceolate, acute, coriaceous, attenuated into a slender petiole at the base. Inflorescence about as long as or shorter than the leaves; raceme distichous, several-flowered, up to about 6 cm. long. Dorsal sepal free nearly to the base, about 5–8 mm. long, obtuse, oblong-ligulate, the apex thickened. Lateral sepals joined nearly to their apices, 6–10 mm. long, the lamina oblong, short-caudate at the apex. Petals 3–3.5 mm. long, elliptic-oblong to elliptic-ovate, oblique, acute. Lip about 3 mm. long, short-unguiculate; lamina oblong-pandurate or ovate-oblong and constricted toward the middle, the terminal lobe rounded, ciliate.

Panama.

CHIRIQUÍ: east of Río Caldera, alt. 2000 m., *Killip 3567;* between Alto de las Palmas and top of Cerro de la Horqueta, alt. 2100–2268 m., *Pittier 3229, 5730.* CANAL ZONE: Quebrada Lopez, alt. 30 m., *Allen 2130.*

This species has been reduced to *Scaphosepalum macrodactylon* Rolfe by Kränzlin. Kränzlin probably did not see material from Panama.

21. LEPANTHES Sw.

LEPANTHES Sw. in Nova Acta Soc. Sci. Upsal. 6:85. 1799; in Svensk. Vet-Akad. Handl. 21:249. 1800.

Small repent or caespitose epiphytic herbs. Stems (secondary stems) generally unifoliate, with several loose, often ciliate and pubescent, sheaths below. Leaves coriaceous. Inflorescence terminal, 1 or few from the base of the leaves, the flowers small, often distichous. Sepals subequal, often more or less connate at the bases or the laterals connate nearly to their apices. Petals shorter than the sepals, bipartite or transversely bilobed, usually short-unguiculate and adnate to the column, except *L. eximia*. Lip bilobed or sometimes trilobed, with the mid-lobe small and inconspicuous, adnate to the column, the lobes usually appearing as wings. Column short, footless, wingless, dilated at the apex; anther terminal, operculate, incumbent; pollinia 2, waxy.

An easily distinguished genus with many closely allied and poorly defined species.

a. Petals simple, not bilobed and transverse..... 8. L. EXIMIA
aa. Petals not simple, bilobed and transverse.
  b. Sepals linear-lanceolate, at least 5 times longer than broad..... 7. L. INSECTIFLORA
  bb. Sepals broader than linear-lanceolate, less than 5 times longer than broad.
    c. Anterior lobe of the petal as long as the dorsal sepal..... 5. L. ROTUNDIFOLIA
    cc. Anterior lobe of the petal shorter than the dorsal sepal.
      d. Dorsal sepal less than 4 mm. long.
        e. Petals 3-nerved..... 6. L. TURIALVAE
        ee. Petals 1-nerved..... 1. L. CHIRIQUENSIS
      dd. Dorsal sepal 4 mm. long or longer.
        f. Petal 1-nerved; dorsal sepal 14–17 mm. long..... 4. L. MAXONII
        ff. Petals 3-(5-)nerved; dorsal sepal 4–8 mm. long.
          g. Dorsal sepal about 4–6 mm. long, ovate..... 3. L. ECILIATA
          gg. Dorsal sepal about 8 mm. long, lanceolate..... 2. L. ELATA

1. LEPANTHES CHIRIQUENSIS Schltr. in Fedde Rep. Sp. Nov. Beih. 17:17. 1922. *Lepanthes micrantha* Ames, Sched. Orch. 4:31. 1923.

Small, caespitose, epiphytic herbs up to 10 cm. tall. Secondary stems slender, up to about 8 mm. long. Leaves 1–4 cm. long and 0.3–1.1 cm. broad, variable, linear-lanceolate to ovate. Inflorescence few-flowered, shorter than the leaves. Dorsal sepal 2–2.5 mm. long and 1.2–1.5 mm. broad, oblong-ovate to lanceolate-ovate, acute. Lateral sepals 1.5–2 mm. long and 0.75–1.2 mm. broad, ovate-lanceolate, acute, arcuate, sometimes denticulate toward the apex. Petals 0.5–0.7 mm. long and 2–2.5 mm. broad, transverse, ciliate, the lobes lanceolate to ovate-lanceolate. Lip 0.75–1.2 mm. long and 0.75–1 mm. broad, 3-lobed; the lateral lobes malleoliform, about 0.75–1.2 mm. long; mid-lobe small, apiculiform, about 0.2 mm. long.

Costa Rica and Panama.

CHIRIQUÍ: vicinity of Monte Lirio, valley of upper Río Chiriquí Viejo, alt. 1300–1900 m., *Seibert 174, 194, 198*; "Province of Chiriquí," alt. 4500 ft., *Powell 254*.

Lepanthes chiriquensis has been referred to *L. Lindleyana* Oerst. & Reichb. f. as a synonym, which it may be, but the original description and figures of *L. Lindleyana* are either very inaccurate or the species is quite different.

2. LEPANTHES ELATA Reichb. f. Beitr. Orch. Centr.-Am. 90. 1866.

Rather large, caespitose, epiphytic herbs up to 6 dm. tall. Secondary stems up to 5 dm. long, covered with scarious sheaths which are glabrous or at most ciliate. Leaves 3.5–12 cm. long and 1.8–7 cm. broad, lanceolate-ovate to oval, acuminate. Inflorescences 1 or more from the axils of each leaf, densely flowered; bracts very crowded, ovate-acuminate, infundibuliform. Dorsal sepal about 8 mm. long and 3 mm. broad, lanceolate, acuminate. Lateral sepals about 8 mm. long and 3 mm. broad, lanceolate, acuminate, somewhat oblique, connate nearly to the middle. Petals transverse, about 5 mm. broad; the posterior lobe about 2.5 mm. long, oblong-obovate; the anterior lobe about 2.5 mm. long and about 2 mm. broad, the lateral lobes malleoliform, the mid-lobe small, apiculiform.

Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, alt. 6000 ft., *Davidson 237.*

3. LEPANTHES ECILIATA Schltr. in Fedde Rep. Sp. Nov. 12:203. 1913.

Erect, caespitose, epiphytic herbs up to about 18 cm. tall. Secondary stems slender, covered with several sheaths, the mouths of which are eciliate but puberulous. Leaves 3.5–7.5 cm. long and 0.8–1.8 cm. broad, elliptic or lanceolate, erect, attenuated to the base. Inflorescences several, about half as long as the leaves. Sepals ovate, ciliate; dorsal sepals about 4–6 mm. long and about 3.5 mm. broad, short-acuminate; lateral sepals about 4–5 mm. long and together about 3.5 mm. broad, acuminate, oblique, connate to about the middle. Petals about 4 mm. broad, transverse, glabrous; anterior lobe oblong, oblique, obtuse; posterior lobe narrowly oblong, obtuse, oblique. Lip about 1–1.5 mm. long, bipartite and with an apicule in the sinus, lobes semirhombic, obtuse, glabrous.

Panama.

CHIRIQUÍ: Bajo Chorro, alt. about 1800 m., *Davidson 128 in part;* Cerro de la Horqueta, alt. 1700 m., *Pittier 3173.*

4. LEPANTHES MAXONII Schltr. in Fedde Rep. Sp. Nov. 12:204. 1913.

Small, caespitose, epiphytic herbs up to about 15 cm. tall. Secondary stems up to about 9 cm. long, covered with several pubescent or scabrous infundibuliform bracts. Leaves 3.5–5.5 cm. long and 1.5–2.5 cm. broad, ovate, acuminate, apex tridenticulate. Inflorescence distichous, fractiflex, exceeding the leaves; flowers large for the genus. Sepals connate at the base; dorsal sepal 14–17 mm. long and about 4–5 mm. broad, triangular-lanceolate or lanceolate, long-acuminate; lateral sepals connate to the middle or beyond, 12–17 mm. long and together 5–6 mm. broad, broadly lanceolate, acute or acuminate. Petals transverse, about 3–4 mm. broad; anterior lobe narrowly oblong to lanceolate, arcuate, acute or obtuse, about equal to the posterior lobe in length; posterior lobe narrowly lanceolate,

arcuate, acute. Lip about 1 mm. long and 1 mm. broad, bipartite, the lobes subrhombic.

Panama.

CHIRIQUÍ: between Alto de las Palmas and Cerro do la Horqueta, alt. 2100–2268 m., *Maxon 3256;* same locality, *Pittier 5494.*

5. LEPANTHES ROTUNDIFOLIA L.Wms. in Ann. Missouri Bot. Gard. 27: 275, *pl. 31, figs. 9-11.* 1940.

Small, caespitose, epiphytic herbs up to about 8 cm. tall. Secondary stems slender, covered with sheaths which are glabrous except at their margins. Leaves about 25 mm. long and 19–28 mm. broad, orbicular or orbicular-ovate, or even broader than long, coriaceous. Inflorescence distichous, shorter than the leaves. Dorsal sepal about 3 mm. long and 2 mm. broad, suborbicular, abruptly acuminate. Lateral sepals about 2.5 mm. long and 2 mm. broad, suborbicular, obtuse or acutish, connate at their bases. Petals bipartite; lobes near the dorsal sepal longest, about 3.5 mm. long and 1 mm. broad, lanceolate, acute, oblique; lobes near the lateral sepals about 2 mm. long and 0.8 mm. broad, lanceolate, acute, oblique. Lip bipartite, about 1.5 mm. long and 2 mm. broad, the lobes malleoliform.

Panama.

COCLÉ: north rim, vicinity of El Valle, alt. 800–1000 m., *Allen 1835.*

Fig. 95. *Lepanthes rotundifolia*

6. LEPANTHES TURIALVAE Reichb. f. in Bonplandia 3:225. 1855; Xenia Orch. 1:151, *t. 50, figs. V, 15-16.* 1855.

Small epiphytic herbs up to 15 cm. tall. Secondary stems slender, covered with sheaths which are usually dark-colored. Leaves 1.5–4.5 cm. long and 0.9–2 cm. broad, elliptic-oblong to suborbicular, attenuated into a short petiole at the base. Sepals lanceolate to ovate-lanceolate, acute; dorsal sepal about 2.5–3.5 mm. long and 1.5–2.2 mm. broad; lateral sepals about 2.2–3 mm. long and 1–1.5 mm. broad, connate to the middle or beyond. Petals about 0.5–1.5 mm. long and 3–4 mm. broad, transverse, posterior lobe the larger. Lip about 1–1.5 mm. long and 1.5–2 mm. broad, trilobate; the lateral lobes large and peltate or flattened; midlobe apiculiform.

Mexico to Panama.

CHIRIQUÍ: vicinity of Casita Alta, alt. 1500–2000 m., *Woodson, Allen & Seibert 954.* COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 1241;* north of El Valle de Antón, alt. 800–1000 m., *Allen 2265.*

The description is based on Panamanian material only. *Lepanthes turialvae,* as now delimited, is possibly an aggregate of several species.

7. LEPANTHES INSECTIFLORA C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 7:152. 1939.

Small, caespitose, epiphytic herbs up to about 9 cm. tall. Secondary stems slender, 2.5–7.5 cm. long. Leaves up to 2.5 cm. long and 0.9 mm. broad, elliptic-oval to subrhombic, apex tridenticulate. Inflorescence several-flowered, shorter than the leaves. Sepals about 5 mm. long and 0.5–1 mm. broad, linear-lanceolate, acuminate. Petals transversely bipartite; posterior lobe about 3 mm. long, subfiliform; anterior lobe about 0.7 mm. long, subovate. Lip about 1 mm. long and as broad, suborbicular, deeply emarginate and bilobed, with a minute apicula in the sinus.

Panama.

CHIRIQUÍ: Bajo Chorro, alt. about 1800 m., *Davidson 185.*

Differs from *L. tipulifera* Reichb. f. only in having the anterior lobe of the petal shorter. Material seen inadequate.

8. LEPANTHES EXIMIA Ames, Sched. Orch. 5:21. 1923.

Lepanthes abnormis Schltr. in Fedde Rep. Sp. Nov. Beih. 19:21. 1923.

Small, caespitose, epiphytic herbs up to 6 cm. tall. Secondary stems very slender, up to 4 cm. long, covered with infundibuliform sheaths. Leaves 0.6–2 cm. long, 0.4–0.7 cm. broad, elliptic to oval, acute or obtuse, attenuated to the base. Sepals 2–3 mm. long and 1–1.5 mm. broad, ovate-lanceolate, acute or acuminate, denticulate. Petals 1–1.5 mm. long and 0.2–0.4 mm. broad, linear, auriculate on the anterior margin at the base, not transverse. Lip 1–1.4 mm. long and 0.6–0.8 mm. broad, oblong to subquadrate, short-unguiculate, retuse or emarginate, ecallose.

Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, alt. about 1800 m., *Davidson 186.*

Unusual in having petals which are not transverse.

22. ACOSTAEA Schltr.

ACOSTAEA Schltr. in Fedde Rep. Sp. Nov. Beih. 19:283. 1923.

Small, caespitose, epiphytic herbs. Secondary stems very short, unifoliate, covered with a loose sheath. Leaves subcoriaceous, attenuated into a petiole at the base and with an abscission layer above the one at the apex of the secondary stem. Inflorescence terminal, usually one from each stem, few-flowered; flowers small. Dorsal sepal broad, cucullate, enclosing the column. Lateral sepals connate into an oblong, bidentate lamina, longer than the dorsal sepal. Petals small,

linear, inserted on the apex of the column-foot, retuse at the apex and with a large, auriculate, hood-shaped callus or ligule toward the base. Column arcuate, with a broad, membranaceous wing on each side; column-foot elongated, subequal to the column; pollinia 2, ceraceous.

A small genus of only two species, one Panamanian. Perhaps the most distinctive of the Pleurothalloid genera in Central America.

1. ACOSTAEA COSTARICENSIS Schltr. in Fedde Rep. Sp. Nov. Beih. 19:284. 1923.

Very small, caespitose, epiphytic herbs up to about 3 cm. tall. Secondary stems up to about 1 mm. long. Leaves 9–15 mm. long and 2.5–6 mm. broad, obovate-spatulate, obtuse, attenuated into a petiole at the base. Inflorescence up to about 3 cm. long, few-flowered; peduncle slender, exceeding the leaves; flowers small. Dorsal sepal 2.5–3 mm. long and 3–4 mm. broad, suborbicular, transverse, strongly cucullate, obtuse. Lateral sepals 4–5.5 mm. long and together 2–2.5 mm. broad, elliptic to elliptic-oblong, connate nearly to their apices and with the free parts acute. Petals 1.5–2 mm. long and 0.3–0.5 mm. broad, ligulate, obtuse or acute, falcate. Lip 2–2.5 mm. long and 0.5–1 mm. broad, with a large, thin, hood-shaped callus near the base, apex emarginate and the lobules divergent. Column arcuate, broadly winged, the wings membranaceous and subquadrate.

Costa Rica and Panama.

COCLÉ: hills north of El Valle de Antón, alt. about 1000 m., *Allen 2352;* trail to Las Minas, El Valle de Antón, alt. 1000 m., *Allen 2892;* mountains beyond La Pintada, alt. 400–600 m., *Hunter & Allen 593.*

23. PLEUROTHALLIS R. Br.

PLEUROTHALLIS R. Br. in Aiton, Hort. Kew. ed. 2, 5:211. 1813; Lindl. Folia Orch. Pleuroth. 1859.

Restrepia HBK. Nov. Gen. & Sp. Pl. 1:366, *t. 94.* 1816.
Kraenzlinella O. Ktze. in Post & Kuntze, Gen. Phan. 310. 1904.
Platystele Schltr. in Fedde Rep. Sp. Nov. 8:565. 1910.

Small to medium-sized epiphytic herbs with caespitose or repent primary stems. Inflorescence terminal or rarely pseudo-radical. Sepals subequal, erect or spreading; dorsal sepal free or connate with the lateral sepals for a short distance, apex sometimes clavellate; lateral sepals from nearly free to connate to their tips, often gibbous at the base. Petals usually shorter and narrower than the sepals, apices plain or clavellate. Lip simple or three-lobed, shorter or about as long as, or sometimes longer than, the petals, often unguiculate. Column about as long or shorter than the lip, winged or wingless, produced into a foot, or sometimes footless at the base; column-foot, when present, from short to as long as the column. Anther terminal, operculate; pollinia 2 or 4, ceraceous.

Pleurothallis is one of the largest of the New World genera of orchids with many diverse forms. The division of the genus most often used is that which was proposed by Pfitzer (in Engl. & Prantl, Nat. Pflanzenfam., Nachträge zu Teil II-IV:105. 1897), but that is wholly artificial and quite impossible to use. The

separations used here are quite as artificial as those of Pfitzer and have nothing to recommend them except, as far as the Panamanian species are concerned, they are convenient even though they are not absolute. Further, it may cause allied species to be widely separated.

a. Apices of the dorsal sepals or of the petals not clavellate.
  b. Sheaths not appressed to the stems, ciliate at their mouths....Series I. Lepanthiformes (p. 86)
  bb. Sheaths usually appressed to the stems, their mouths always glabrous.
    c. Inflorescence exceeded by the subtending leaf, 1-flowered, fascicled or racemose .....Series II. Brachystacheae (p. 86)
    cc. Inflorescence subequal to or exceeding the subtending leaf, 1-flowered, a fascicle on a long peduncle, or racemose.....Series III. Elongatae (p. 87)
aa. Apices of the dorsal sepals and of the petals clavellate.....Series IV. Restrepiae (p. 88)

Series I. Lepanthiformes.—A small, rather natural group of species which are easily distinguished by the loose ciliate sheaths; inflorescence either longer or shorter than the subtending leaf.

a. Petals not ciliate nor ciliate-lacerate toward the apex; stems with 1–3 leaves..... 1. P. Broadwayi
aa. Petals ciliate or ciliate-lacerate toward the apex.
  b. Sepals glandular-pubescent dorsally..... 2. P. gnomonifera
  bb. Sepals glabrous and smooth dorsally.
    c. Leaves narrowly elliptic to oval, margins not recurved..... 3. P. Blaisdellii
    cc. Leaves broadly oval to suborbicular-ovate, sphacelate margins prominently recurved..... 4. P. rotundata

Series II. Brachystacheae.—An artificial group which probably has no phylogenetic value but is of value in separating and keying species of this difficult genus. Plants in which the inflorescence is exceeded by the subtending leaf. Inflorescence a single flower, a fascicle of flowers, a raceme or fascicle of racemes.

a. Inflorescence a fascicle of one to many flowers at the apex of the secondary stem.
  b. Leaves distinctly cordate at the base, mostly broad.
    c. Lip about 6 mm. long; petals 2- to 3-nerved; flowers relatively large..... 5. P. cardiochila
    cc. Lip 4 mm. or less long; petals 1-nerved; flowers relatively small.
      d. Petals ciliate or denticulate.
        e. Base of the lamina of the lip with a transverse E-shaped callus..... 6. P. rhodoglossa
        ee. Base of the lamina of the lip without an E-shaped callus.
          f. Lip triangular or triangular-subquadrate; disc smooth..... 7. P. triangulabia
          ff. Lip cordate to oblong-cordate; disc verrucose..... 8. P. antonensis
      dd. Petals neither ciliate nor denticulate.
        e. Base of the lip with linear-lanceolate arms; petals semi-terete above..... 9. P. arietina
        ee. Base of the lip without lateral arms; petals not semi-terete.
          f. Base of lamina of the lip with a transverse E-shaped callus..... 6. P. rhodoglossa
          ff. Base of the lamina of the lip without a transverse E-shaped callus..... 10. P. homolantha
  bb. Leaves not distinctly cordate at the base, usually attenuated.
    c. Secondary stems winged..... 25. P. alpina
    cc. Secondary stems not winged.
      d. Lateral sepals free at least above the middle, usually nearly to their bases.
        e. Ovary echinate..... 20. P. tribuloides
        ee. Ovary not echinate.
          f. Petals abruptly dilated at the base..... 15. P. trachychlamys
          ff. Petals not abruptly dilated at the base.
            g. Lip simple..... 18. P. octomeriae
            gg. Lip with small falcate lateral lobes above the base..... 19. P. uncinata
      dd. Lateral sepals connate to their apices or nearly so.

e. Lip deeply saccate-concave..... 12. P. CONCAVIFLORA
ee. Lip not saccate-concave.
f. Petals serrulate (or ciliate).
g. Dorsal sepal suborbicular; lip not *Stelis*-like..... 13. P. COBRAEFORMIS
gg. Dorsal sepal lanceolate; lip *Stelis*-like..... 11. P. SIMULANS
ff. Petals entire (sometimes ciliolate).
g. Sepals forming a distinct tube at the base, hispidulous dorsally..... 21. P. HISPIDA
gg. Sepals not forming a distinct tube at the base, the dorsal free from the laterals, glabrous.
h. Ovaries echinate..... 20. P. TRIBULOIDES
hh. Ovaries not echinate.
i. Lip about as broad as long, with large basal lobes..... 14. P. ALLENII
ii. Lip longer than broad, simple or at least not with large basal lobes.
j. Pedicels of the flowers less than ¼ as long as the leaves..... 17. P. RUSCIFOLIA
jj. Pedicels of the flowers at least half as long as the leaves..... 16. P. EUMECOCAULON
aa. Inflorescence a few- to several-flowered raceme.
b. Secondary stems less than half as long as the leaves they bear.
c. Sepals pubescent within..... 46. P. SEGOVIENSIS
cc. Sepals glabrous within.
d. Inflorescence a fascicle of short racemes, much shorter than the subtending leaf..... 36. P. STENOSTACHYA
dd. Inflorescence a single raceme nearly as long as the subtending leaf..... 37. P. OVATILABIA
bb. Secondary stems at least half as long as the leaves that they bear.
c. Petals linear or linear-lanceolate, entire.
d. Lip lepidote-verrucose above..... 28. P. LEPIDOTA
dd. Lip not lepidote-verrucose above..... 42. P. PRUINOSA
cc. Petals broader than linear or linear-lanceolate (or if not then serrulate), entire or serrulate.
d. Petals very strongly recurved-arcuate; denticulate..... 33. P. ROWLEEI
dd. Petals not strongly recurved-arcuate; denticulate or entire.
e. Lip broader than long, transversely elliptic..... 34. P. PRAEGRANDIS
ee. Lip not broader than long nor transversely elliptic.
f. Lip with small lateral lobes near the middle.
g. Secondary stems with prominent wings.
(Cf. also P. VELATICAULIS)
h. Dorsal sepal 9–11 mm. long, elliptic-obovate..... 29. P. COGNIAUXIANA
hh. Dorsal sepal 6–6.5 mm. long, elliptic to oblong-oblanceolate..... 25. P. ALPINA
gg. Secondary stems wingless.
h. Petals denticulate, obovate..... 30. P. VITTATA
hh. Petals not denticulate, oblong to oblong-oblanceolate.... 31. P. VELATICAULIS
ff. Lip without lateral lobes near the middle.
g. Petals not serrulate.
h. Lip with erect auricles near the middle; petals oblong to oblong-oblanceolate..... 31. P. VELATICAULIS
hh. Lip without erect auricles near the middle; petals oblong-obovate to subrhombic..... 32. P. GELIDA
gg. Petals serrulate at least in part.
h. Lateral sepals connate to their apices; petals elliptic to elliptic-lanceolate..... 35. P. ELLIPSOPHYLLA
hh. Lateral sepals free for at least ⅓ their length; petals broader than elliptic or elliptic-lanceolate.
i. Petals oblong-oblanceolate..... 27. P. VERECUNDA
ii. Petals subrhombic-obovate..... 26. P. PTEROCAULIS

Series III. ELONGATAE.—A series of species not necessarily closely allied but having the elongated inflorescence in common. Plants in which the inflorescence exceeds the subtending leaves in length. Inflorescence a single-flowered to a many-flowered raceme or a fascicle of flowers on an elongated peduncle.

a. Inflorescence a 1- to several-flowered fascicle on a long peduncle.

b. Lateral lobes of the lip erect; lamina with a pair of parallel lamellate calluses near the middle..... 23. P. FULGENS
bb. Lateral lobes of the lip, if present, not erect; lamina without parallel lamellate calluses.
c. Peduncle puberulent..... 24. P. GLANDULOSA
cc. Peduncle glabrous..... 22. P. BRIGHAMII
aa. Inflorescence a raceme.
b. Peduncle ancipitous and winged.
c. Apex of the lip obtuse or retuse..... 50. P. SPECTABILIS
cc. Apex of the lip acute..... 49. P. PFAVII
bb. Peduncle not ancipitous nor winged.
c. Lateral sepals free nearly to their bases, at least not connate to near the middle.
d. Ovary muricate..... 51. P. MURICATA
dd. Ovary not muricate.
e. Disc of the lip with 3 prominent longitudinal calluses..... 48. P. DOLICHOPUS
ee. Disc of the lip without prominent longitudinal calluses.
f. Sepals 10 mm. or more long..... 52. P. CRENATA
ff. Sepals 19 mm. or less long.
g. Petals fimbriate or lacerate-fimbriate..... 41. P. ARISTATA
gg. Petals not as above.
h. Lip narrowly oblong; lateral sepals acuminate..... 39. P. CALYPTROSTELE
hh. Lip ovate; lateral sepals acute or obtuse..... 37. P. OVATILABIA
cc. Lateral sepals connate to about the middle or usually to near their apices.
d. Secondary stems less than half as long as the leaves they bear.
e. Ovary echinate..... 40. P. FUEGII var. ECHINATA
ee. Ovary not echinate.
f. Petals fimbriate or lacerate-fimbriate..... 41. P. ARISTATA
ff. Petals not fimbriate nor lacerate-fimbriate.
g. Lip 3-lobed; sepals pubescent within..... 46. P. SEGOVIENSIS
gg. Lip simple; sepals glabrous within..... 38. P. GROBYI
dd. Secondary stems at least half as long as the leaves they bear.
e. Petals linear or linear-lanceolate..... 42. P. PRUINOSA
ee. Petals not linear nor linear-lanceolate, either lanceolate or oblong or broader.
f. Petals truncate..... 43. P. MACRANTHA
ff. Petals acute to obtuse or rounded but not truncate.
g. Sepals pubescent within..... 46. P. SEGOVIENSIS
gg. Sepals glabrous within.
h. Lateral sepals 5–9 mm. long.
i. Petals elliptic-lanceolate to ovate-lanceolate, 6–8.5 mm. long..... 47. P. GHIESBREGHTIANA
ii. Petals oblong-obovate to subrhombic, 2.5–3.5 mm. long..... 32. P. GELIDA
hh. Lateral sepals 12–25 mm. long.
i. Lip with erect basal auricles or lobes; petals verrucose at the apex..... 44. P. TUERCKHEIMII
ii. Lip without basal auricles or lobes; petals not verrucose at the apex..... 45. P. POWELLII

Series IV. RESTREPIAE.—A small, natural group of species mainly distinguished by the clavellate apices of the dorsal sepal and the petals. Sheaths of the secondary stems usually maculate.
a. Disc of the terminal part of the lip verrucose; inflorescence more than half as long as the leaves.
b. Pedicel with a short filamentose appendage on the anterior side just below the ovary..... 53. P. FILAMENTOSA
bb. Pedicel without an appendage..... 54. P. SUBSERRATA
aa. Disc of the terminal part of the lip not verrucose; inflorescence less than half as long as the leaf..... 55. P. XANTHOPHTHALMA

1. PLEUROTHALLIS BROADWAYI Ames, Orch. 2:267. 1908; C. Schweinf. in Bot. Mus. Leaf. Harv. Univ. 8:41. 1940.

Pleurothallis Williamsii Ames, Orch. 7:120. 1922; Sched. Orch. 7:31, *t.* 15. 1924.
Pleurothallis Broadwayi var. *tricarinata* C. Schweinf. loc. cit. 42.

Small, caespitose, epiphytic herbs up to about 15 cm. tall. Secondary stems up to about 6 cm. long, slender, bearing 1–3 leaves. Inflorescence exceeding the leaves; peduncle subfiliform, rachis somewhat fractiflex. Leaves 0.6–1.6 cm. long and 0.3–0.8 cm. broad, elliptic-oval to obovate, obtuse, short-petiolate. Dorsal sepal 3.5–6 mm. long and 1.2–2 mm. broad, lanceolate to ovate-lanceolate, acute or acuminate, somewhat cucullate. Lateral sepals 3–5.5 mm. long and 0.6–1.2 mm. broad, free almost to the base, lanceolate, acute or acuminate, oblique. Petals 1.1–1.5 mm. long and 0.6–0.8 mm. broad, oval to obovate, obtuse, slightly oblique, short-clawed. Lip 1–2 mm. long and 0.7–1.1 mm. broad, elliptic-ovate, obtuse, sometimes obscurely trilobate, the lamina bi-tricarinate, papilliferous, the apex thickened.

Fig. 96. *Pleurothallis Broadwayi*

Mexico, Honduras, Costa Rica, Panama, and the West Indies.

DARIÉN: Cana and vicinity, alt. about 600–1950 m., *Williams 976.*

2. PLEUROTHALLIS GNOMONIFERA Ames, Sched. Orch. 6:61. 1923.

Pleurothallis brevis Schltr. in Fedde Rep. Sp. Nov. Beih. 19:183. 1923.

Small, caespitose, epiphytic herbs up to 12 cm. tall. Secondary stems up to about 8 cm. long, covered with infundibuliform, hispidulous sheaths. Leaves 1.4–4.5 cm. long and 0.6–2 cm. broad, elliptic to ovate, acute or obtuse, coriaceous, attenuated into a short petiole at the base. Inflorescence one to several racemes from the axil of the leaf, usually less than half as long as the leaves, few-flowered. Sepals glandular-pubescent dorsally; dorsal sepal about 3–4 mm. long and 1 mm. broad, oblong-lanceolate, acute or obtuse; lateral sepals 3–4 mm. long and together 2.5–3 mm. broad, connate at the base or as far as the middle, free parts oblong, obtuse. Petals about 1.5 mm. long and 0.5 mm. broad, oblong, obtuse, ciliate or lacerate at the apex. Lip 1.6–2 mm. long and 0.5–0.6 mm. broad, narrowly oblong, obtuse, subpandurate, biauriculate at the base, with a small submammillate callus near the base of the disc.

Costa Rica and Panama.

CHIRIQUÍ: Cerro Punta to headwaters of the Río Caldera, alt. 2250–2500 m., *Allen 1466;* Cerro Horqueta, alt. 1500–1800 m., *Powell 311.*

3. PLEUROTHALLIS BLAISDELLII S. Wats. in Proc. Am. Acad. 23:284. 1888.

Pleurothallis peraltensis Ames, Sched. Orch. 6:65. 1923; loc. cit. 7: *t. 11, figs. 1-5.* 1924.

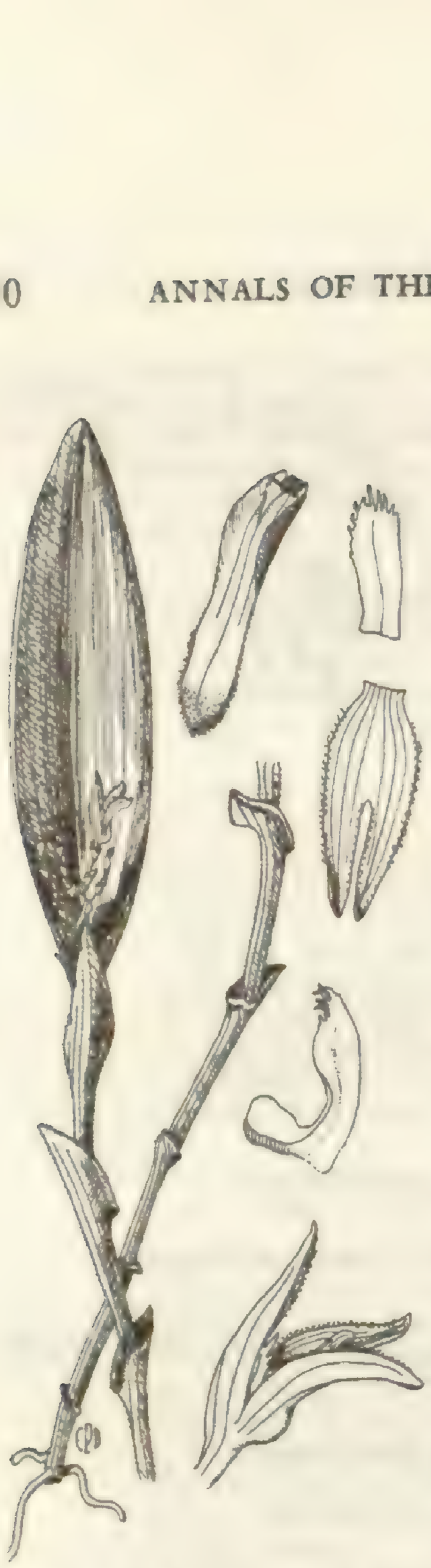


Fig. 97. *Pleurothallis Blaisdellii*

Small, caespitose, epiphytic herbs up to about 15 cm. tall. Secondary stems up to 10 cm. long, covered with several more or less pubescent, loose sheaths which disintegrate with age. Leaves 2–6.5 cm. long and 0.4–2 cm. broad, narrowly elliptic to oval, acute or obtuse, coriaceous, attenuated into a short petiole at the base. Inflorescence a raceme or fascicle of racemes, short, usually less than half as long as the leaves, few-flowered. Dorsal sepal 4–6 mm. long and 1.5–2 mm. broad, lanceolate to oblong-lanceolate, acute, usually eciliate. Lateral sepals 4–6 mm. long and together 2.5–3 mm. broad, connate at the bases or nearly to the middle, free portions oblong-lanceolate, acute or obtuse, usually ciliate toward the base on the outer side. Petals 2–2.5 mm. long and 1–1.5 mm. broad, oblong, obtuse, apical part ciliate or fimbriate. Lip 2.5–3 mm. long and 0.75–1 mm. broad, oblong-lanceolate or oblong-pandurate, obtuse, ciliate, auriculate at the base, short-unguiculate.

Mexico, British Honduras, Honduras, Costa Rica, and Panama.

CHIRIQUÍ: Bajo Chorro, alt. about 1800 m., *Davidson 169*; "Chiriquí Province," alt. about 1200 m., *Powell 424.*

4. PLEUROTHALLIS ROTUNDATA C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 4:115. 1937.

Small, caespitose, epiphytic herbs up to about 13 cm. tall. Secondary stems up to about 9 cm. long, slender, covered with several hispid, infundibuliform sheaths. Leaves 2.5–4.5 cm. long and 2–3.7 cm. broad, broadly oval to suborbicular-ovate, obtuse, with a very short petiole, the margins sphacelate and rolled toward the dorsal surface. Inflorescence a fascicle of 1(–few?)-flowered racemes, shorter than the leaves. Dorsal sepal 4.5–5.5 mm. long and 1.5–2.1 mm. broad, lanceolate, acute or acuminate, ciliate or eciliate. Lateral sepals about 5 mm. long and together 2.5–3 mm. broad, ovate-lanceolate, connate to about the middle, free apices fleshy-thickened, ciliate laterally toward the base and near the sinus within. Petals about 1.5 mm. long and 0.75 mm. broad, oblong or oblong-obovate, obtuse, the apex ciliate-lacerate. Lip 2.5–3 mm. long and 0.8–1 mm. broad, lanceolate to ligulate-lanceolate, acute or acuminate, ciliolate, short-unguiculate.

Endemic to Panama.

COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 1242;* north rim of El Valle de Antón, alt. 600–1000 m., *Allen 1676;* hills north of El Valle de Antón, alt. about 1000 m., *Allen 2206, 2259;* mountains beyond La Pintada, alt. 400–600 m., *Hunter & Allen 561.*

Fig. 98. *Pleurothallis cardiochila*

5. PLEUROTHALLIS CARDIOCHILA L. Wms. in Ann. Missouri Bot. Gard. 29:343. 1942.

Small, caespitose, epiphytic herbs up to about 21 cm. tall. Secondary stems up to about 11 cm. long, slender, with 1–2 loose chartaceous sheaths toward the base, naked above. Leaves 9–10 cm. long and 3.6–3.9 cm. broad, lanceolate-cordate, acuminate, coriaceous. Inflorescence a 1(–few?)-flowered fascicle subtended by a chartaceous sheath about 1–1.5 cm. long, much shorter than the leaves. Flowers very large for the group, yellowish with the dorsal sepal tinged with dark red, lip

deep orange. Dorsal sepal about 20 mm. long and 12.5 mm. broad, oblong-oval, obtuse, with 7–9 principal nerves, strongly cucullate. Lateral sepals connate to their apices, about 18 mm. long and 10 mm. broad, ovate, acute, with 7–9 principal nerves. Petals about 13 mm. long and 2.5 mm. broad, linear-oblong, acute, arcuate, subauriculate on the posterior margin at the base, entire, 3-nerved at the base, the posterior nerve short, the anterior nerve branched near the base, hence the apical part of the petal 3-nerved. Lip unguiculate; lamina about 6 mm. long and 5.5 mm. broad, suborbicular-cordate, obtuse, callus thickened along the basal sinus and below the subapiculate apex, 3-nerved; claw about 2 mm. long, oblong.

Endemic in Panama.

CHIRIQUÍ: Bajo Chorro, alt. about 1800 m., *Davidson 119*.

Pleurothallis cardiochila is most closely allied to *P. palliolata* Ames, from which it is distinguished by the suborbicular-cordate lip and the 3-nerved, entire petals.

6. PLEUROTHALLIS RHODOGLOSSA Schltr. in Fedde Rep. Sp. Nov. Beih. 17:22. 1922.

Small, caespitose, epiphytic herbs up to about 2 dm. tall. Secondary stems up to about 13 cm. long, slender, with 1–2 sheaths at the base, otherwise naked. Leaves 4–7 cm. long and 2.2–4 cm. broad, broadly ovate-cordate, acute or acuminate, coriaceous. Flowers rather small, greenish with a purple lip. Dorsal sepal about 3.5–4 mm. long and 1.8–2.2 mm. broad, oblong-obovate, obtuse, 3-nerved. Lateral sepals about 3 mm. long and 3 mm. broad, orbicular, connate to the apices. Petals about 2–2.5 mm. long and 0.5–0.7 mm. broad, linear-ligulate, acute, slightly arcuate, obscurely denticulate (ciliolate, fide Schltr.). Lip about 1.4–1.7 mm. long and 1.1–1.3 mm. broad, cordate or narrowly cordate, obtuse; lamina fleshy and with a transverse E-shaped callus toward the base (open part of the "E" toward the base).

Panama.

CHIRIQUÍ: "Province of Chiriquí," alt. 1200 m., *Powell 182*. (Schlechter in his description cites *Powell 182* but gives the locality as "Auf Hügeln bei Panama-city").

Two specimens of this have been seen. The one in the Ames Herbarium gives the data cited above. The specimen in the Herbarium of the Missouri Botanical Garden bears the data given by Schlechter. The Chiriquí locality is doubtless correct.

7. PLEUROTHALLIS TRIANGULABIA C. Schweinf. in Ann. Missouri Bot. Gard. 24:183. 1937.

Caespitose epiphytic herbs up to about 4 dm. tall. Secondary stems up to about 3 dm. long, slender, with loose sheaths which soon disintegrate. Leaves 3.5–12 cm. long and 1.3–6 cm. broad, oblong-cordate to ovate-cordate, acuminate, coriaceous. Inflorescence a 1- to few-flowered fascicle, the flowers rather large. Dorsal sepal 9–12 mm. long and 6–9 mm. broad, oblong-ovate to oval, acute or obtuse, larger than the combined laterals. Lateral sepals 9–12.5 mm. long and

together 5–8 mm. broad, ovate-lanceolate to broadly ovate, acute or obtuse, connate to their tips. Petals 6–8 mm. long and 1.5–2.1 mm. broad, elliptic-linear, acute, ciliate to lacerate-dentate, arcuate. Lip 3.2–4 mm. long and 3–4 mm. broad, triangular to triangular-subquadrate, surface verrucose, base truncate with a submammillate callus in the middle with cavities on either side.

Costa Rica and Panama.

CHIRIQUÍ: Cerro Punta to headwaters of the Río Caldera, alt. 2250–2500 m., *Allen 1468;* valley of the upper Río Chiriquí Viejo, alt. 1300–1900 m., *Seibert 269;* Bajo Chorro, alt. 1800 m., *Davidson 223.*

8. PLEUROTHALLIS ANTONENSIS L. Wms. in Ann. Missouri Bot. Gard. 29:341. 1942.

Caespitose epiphytic herbs up to about 3 dm. tall. Secondary stems slender, with one or two scarious sheaths at the base, naked above. Leaves 4–9 cm. long and 1.5–4.7 cm. broad, lanceolate-cordate to broadly cordate (juvenile leaves elliptic), acute or acuminate, coriaceous. Inflorescence a 1- to several-flowered fascicle from the apex of the secondary stems, much shorter than the subtending leaves. Dorsal sepal 6–7.5 mm. long and 3–4 mm. broad, elliptic-obovate, obtuse or acute, 3-nerved. Lateral sepals connate to their apices, 5.5–7 mm. long and 4–5 mm. broad, ovate to broadly ovate, obtuse or acute, 6-nerved. Petals 3.8–4.5 mm. long and 0.6–1 mm. broad, linear-oblong, acute, serrulate, strongly arcuate, 1-nerved. Lip unguiculate; lamina 2.5–3 mm. long and 2–2.5 mm. broad, cordate to oblong-cordate, denticulate, fleshy, the surface obscurely verrucose or smooth, with a small central cavity near the base; claw short.

Endemic in Panama.

COCLÉ: hills north of El Valle de Antón, alt. about 1000 m., *Allen 2156;* same locality, *Allen 2194, 2267, 2701;* mountains beyond La Pintada, alt. about 400–600 m., *Hunter & Allen 594.*

Specimens of *Pleurothallis antonensis* have been referred to *P. phyllocardia* Reichb. f., a rather obscure and poorly described species.

9. PLEUROTHALLIS ARIETINA Ames, Sched. Orch. 4:16. 1923; loc. cit. 7: *t. 16.* 1924.

Caespitose epiphytic herbs up to 3.5 dm. tall. Secondary stems up to 2.5 dm. long, slender, ancipitous or winged, at least when dry, with one or more basal sheaths, naked above. Leaves 6–13 cm. long and 1.5–3.5 cm. broad, lanceolate to ovate-lanceolate, acute or acuminate, cordate at the base when mature, coriaceous. Inflorescence a fascicle of 1–several, rather long-pedicellate flowers, shorter than the leaves. Dorsal sepal 9–10 mm. long and 2.5–4 mm. broad, oblong to oblong-lanceolate, obtuse, cucullate, fleshy. Lateral sepals 9–10 mm. long and together 2–4 mm. broad, oblong or oblong-lanceolate, obtuse, cucullate, fleshy, connate to their apices. Petals 7–10 mm. long and 1.4–1.8 mm. broad, linear-oblong or linear-lanceolate, obtuse, attenuated into a thin claw at the base, the apical half semi-terete. Lip 1.5–2.5 mm. long and 2–3 mm. broad when expanded, triangular-crescentiform and with two linear-lanceolate arms at the base, the

Fig. 99. *Pleurothallis arietina*

whole when spread out suggesting a ram's head.

Costa Rica and Panama.

CHIRIQUÍ: Cerro Horqueta, alt. 1500–1660 m., *Powell 288.* COCLÉ: mountains beyond La Pintada, alt. 400–600 m., *Hunter & Allen 595.*

10. PLEUROTHALLIS HOMOLANTHA Schltr. in Fedde Rep. Sp. Nov. Beih. 19:106. 1923.

Pleurothallis nemorum Schltr. loc. cit. 191.

Small, caespitose, epiphytic herbs up to about 3.5 dm. tall. Secondary stems up to about 23 cm. long, slender, with one or more sheaths toward the base, naked above. Leaves 3.5–10 cm. long and 0.9–3.5 mm. broad, elliptic-lanceolate to ovate, cordate at the base, acute or acuminate. Inflorescence a fascicle of 1–few flowers, much shorter than the leaves. Dorsal sepal 6–10 mm. long and 3–4.5 mm. broad, elliptic-oblong to elliptic-obovate, acute. Lateral sepals connate to their apices, 6–10 mm. long and 3.5–6 mm. broad, lanceolate-ovate to ovate, acute, somewhat cucullate. Petals 3.5–5 mm. long and 0.5–1 mm. broad, elliptic-linear, acute, arcuate, glabrous. Lip unguiculate; lamina 2–3.5 mm. long and 1.5–3 mm. broad, oblong-cordate, obtuse (rarely acutish), fleshy.

Costa Rica and Panama.

CHIRIQUÍ: valley of the upper Río Chiriquí Viejo, *White & White 80.* COCLÉ: El Valle, alt. 600–1000 m., *Allen 1236.*

11. PLEUROTHALLIS SIMULANS L. Wms. in Ann. Missouri Bot. Gard. 27:281, *pl. 33, figs. 8-10.* 1940.

Small, caespitose, epiphytic herbs up to about 10 cm. tall. Secondary stems 2.5–6 cm. long, slender, usually a little longer than the leaves, with one or two sheathing bracts at the base. Leaves 3–5 cm. long and 0.5–0.8 cm. broad, ligulate to elliptic-oblanceolate, obtuse, coriaceous, submarginate. Inflorescence 1-flowered or a few-flowered fascicle, shorter than the subtending leaf. Dorsal sepal about 10 mm. long and 3.5–4 mm. broad, lanceolate, acuminate. Lateral sepals connate to their apices, about 10 mm. long and 4.5–5 mm. broad, broadly lanceolate, acuminate. Petals 5–6 mm. long and 2–2.5 mm. broad, broadly elliptic to subrhombic, acute or acuminate, lacerate-ciliate nearly to the base. Lip 3–3.5 mm. long and 2–2.5 mm. broad, simple, subcordate in outline, acuminate, the anterior margin somewhat serrulate, the disc covered with a thick callus simulating that found in species of *Stelis;* the callus with an anterior rim, an inconspicuous depression toward its apex and sharply declined to the attachment of the lip.

Panama.

COCLÉ: north rim of El Valle de Antón, *Allen 1912;* trail to Las Minas, hills north of El Valle de Antón, *Allen 2749.*

An interesting and conspicuous species of *Pleurothallis* because of the unusual structure of the lip.

Fig. 100. *Pleurothallis simulans*

12. PLEUROTHALLIS CONCAVIFLORA C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 4:114. 1937; L. Wms. in Ann. Missouri Bot. Gard. 28:416. 1941.

Small, caespitose, epiphytic herbs up to about 11 cm. tall. Secondary stems up to about 7 cm. long, slender. Leaves 2.5–4 cm. long and 0.7–1.5 cm. broad, elliptic-oblong, obtuse or acute, coriaceous. Inflorescence a fascicle of 1- to several-flowered peduncles. Sepals obscurely puberulent or glabrous within. Dorsal sepal 4–5 mm. long and 2.5–3.3 mm. broad, oblong-ovate to oblong-obovate, acute or obtuse, cucullate, fleshy. Lateral sepals connate to their apices, about 4.5 mm. long and 4–5 mm. broad, ovate-suborbicular to suborbicular, cucullate, obtuse or acute. Petals 1.7–2.5 mm. long and 0.6–0.9 mm. broad, linear-oblong to elliptic-oblong, acute or obtuse. Lip 2–2.5 mm. long and 1–1.5 mm. deep, 3-lobed or at least the base produced into prominent retrorse auricles, saccate-

concave, apiculate at the apex; lateral lobes or auricles retrorse or erect, triangular-lanceolate; the disc with a callus connecting the bases of the lobes or auricles.

Costa Rica and Panama.

COCLÉ: vicinity of El Valle de Antón, alt. about 600 m., *Allen 2058;* vicinity of La Mesa, alt. about 1000 m., *Allen 2317.*

This species seems to differ from *P. excavata* Schltr. only in having slightly smaller flowers. No material of *P. excavata* is available for study. The types of the two units are from the same locality in Costa Rica.

13. PLEUROTHALLIS COBRAEFORMIS L. Wms. in Ann. Missouri Bot. Gard. 27:277, *pl. 34, figs. 7-14.* 1940.

Small, caespitose, epiphytic herbs up to about 13 cm. tall. Secondary stems mostly up to 4–6 cm. long, slender, subequal to the leaves or a little longer.

Fig. 101. *Pleurothallis cobraeformis*

Leaves 4–6 cm. long and 0.8–1.1 cm. broad when mature, obtuse or acute, fleshy. Inflorescence a 1- to several-flowered fascicle (or possibly an abbreviated raceme?), much shorter than the leaves. Dorsal sepal 8–10 mm. long and 7–9 mm. broad, suborbicular, subacute, strongly cucullate. Lateral sepals connate to their apices, about 6–7 mm. long and 4.5–5 mm. broad, broadly oval. Petals 4–6 mm. long and 1.2–2.5 mm. broad, elliptic, acute, arcuate, dentate-ciliate. Lip about 3.5 mm. long and as broad, short-clawed; lamina apiculate, broadly cordate, fleshy,

Fig. 102. *Pleurothallis Allenii*

sharply deflexed, the basal auricles rounded.

Panama.

COCLÉ: vicinity of El Valle de Antón, alt. about 600 m., *Allen 2057*.

14. PLEUROTHALLIS ALLENII L. Wms. in Ann. Missouri Bot. Gard. 27:275, *pl. 33, figs. 5-7*. 1940.

Small, caespitose, epiphytic herbs up to about 15 cm. tall. Secondary stems 3–6 cm. long, slender, shorter than the leaves, with one or two sheaths at the base. Leaves 5–9 cm. long and 0.3–0.6 cm. broad, ligulate to linear-ligulate, obtuse or tridentate, coriaceous. Inflorescence a 1- to several-flowered fascicle, shorter than the leaves, the flowers large for the size of the plant. Dorsal sepal about 15 mm. long and 4 mm. broad, lanceolate, long attenutate-acuminate. Lateral sepals connate nearly to their apices, about 15 mm. long and together about 5 mm. broad, lanceolate, acute. Petals about 12 mm. long and 3 mm. broad, lanceolate, acute or acuminate, slightly oblique. Lip about 4 mm. long and as broad, 3-lobed; the lateral lobes erect, about 1.25 mm. long and 1 mm. broad, broadly oblong, the apices rounded; the mid-lobe about 2 mm. long and 1.5 mm. broad at the base, narrowly triangular, acute; disc very fleshy, with a tripartite raised callus near the middle, and the mid-lobe covered with echinulate protuberances.

Panama.

COCLÉ: vicinity of El Valle de Antón, alt. 600–1000 m., *Allen 1240*; vicinity of La Mesa, alt. about 1000 m., *Allen 2338*.

15. PLEUROTHALLIS TRACHYCHLAMYS Schltr. in Fedde Rep. Sp. Nov. Beih. 17:23. 1922; Ames, Sched. Orch. 7:31, *t. 19*. 1924.

Small, repent, epiphytic herbs. Secondary stems up to about 6 cm. long, covered with scarious sheaths which are scurfy or at least verrucose. Leaves 4.5–7 cm. long and 0.4–1 cm. broad, elliptic to lanceolate, acute. Inflorescence a 1- to few-flowered fascicle. Dorsal sepal 4–5 mm. long and 1.5–1.8 mm. broad, ovate or oblong-lanceolate, acute. Lateral sepals 4–5 mm. long and about 1.5 mm. broad, free to the bases, oblong-lanceolate, acute. Petals about 4 mm. long and 1.5 mm. broad, lanceolate and abruptly expanded near the bases. Lip about 2 mm. long and 1 mm. broad, oblong-oval, obtuse, with 2 small, erect, lateral lobes near the middle, with a small callus at the base.

Costa Rica (?), Panama, and dubiously in Peru.

PANAMÁ: foothills east of Panama City, *Powell 215*.

16. PLEUROTHALLIS EUMECOCAULON Schltr. in Fedde Rep. Sp. Nov. Beih. 19:187. 1923; L. Wms. in Ann. Missouri Bot. Gard. 27:277. 1940.

Small, caespitose, epiphytic herbs up to about 2 dm. tall. Secondary stems slender, strict, with one or two sheaths. Leaves 2.5–7.5 cm. long and 0.4–1.3 cm. broad, linear, elliptic or usually lanceolate, acute, coriaceous. Inflorescence a fascicle of long (2–3 cm.)-pedicellate flowers; one or more short, scarious bracts

at the base. Dorsal sepal 5–7 mm. long and 2.5–3.5 mm. broad, lanceolate to ovate-lanceolate, acute or acuminate, cucullate. Lateral sepals connate to their apices, 4.5–5.5 mm. long and 2.5–3.5 mm. broad, broadly lanceolate to ovate-lanceolate, obtuse or acute, fleshy. Petals 4.5–5 mm. long and about 1–1.5 mm. broad, linear-lanceolate to lanceolate, acuminate, papilliferous, the acumination subterete. Lip 3–3.5 mm. long and 1.5–2 mm. broad, papilliferous to subciliate, lanceolate to oblong-ovate, acute, truncate at the base, slightly constricted above the middle, fleshy, with a small V-shaped excavation above the middle and with 3 raised lines on the dorsal surface.

COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 1237;* hills north of El Valle de Antón in the vicinity of La Mesa, alt. 1000 m., *Allen 2339.*

17. PLEUROTHALLIS RUSCIFOLIA (Jacq.) R. Br. in Aiton, Hort. Kew. ed. 2, 5:211. 1813; Ames in Bot. Mus. Leafl. Harv. Univ. 1[9]: *t. p. 5.* 1933.

Epidendrum ruscifolium Jacq. Enum. Pl. Carib. 29. 1760.
Dendrobium ruscifolium Sw. in Nova Acta Soc. Sci. Upsala 6:84. 1799.
Pleurothallis glomerata Ames, Sched. Orch. 4:21. 1923; loc. cit. 7: *t. 10.* 1924.

Caespitose, epiphytic herbs up to about 5 dm. tall but usually much smaller. Secondary stems up to about 4 dm. long, slender. Leaves 4–20 cm. long and 1–5 cm. broad, linear-lanceolate to elliptic to lanceolate-ovate, acute or acuminate, contracted into a short cucullate petiole at the base. Inflorescence a 1- to many-flowered fascicle. Dorsal sepal 6–10 mm. long and 1.3–3 mm. broad, narrowly to broadly lanceolate, cucullate. Lateral sepals 6–10 mm. long and together 2.5–3 mm. broad, lanceolate to ovate-lanceolate, cucullate, acuminate, connate to their apices. Petals 4–8 mm. long and 0.31 mm. broad, subfiliform to narrowly lanceolate, acute. Lip 1.5–2 mm. long and about 1.2–1.4 mm. broad, ovate to oblong-cordate or ovate-cordate, acute or acuminate.

Costa Rica and Panama, the West Indies, and South America. Reported from Guatemala and Salvador.

CHIRIQUÍ: Bajo Chorro, alt. 1800 m., *Davidson 262.* COCLÉ: hills north of El Valle de Antón, alt. 800–1000 m., *Allen 2269;* trail to Las Minas, hills north of El Valle de Antón, alt. 1000 m., *Allen 2872.*

This variable and widespread species is the generic type of *Pleurothallis.*

18. PLEUROTHALLIS OCTOMERIAE Schltr. in Fedde Rep. Sp. Nov. Beih. 17:21. 1922.

Pleurothallis cerea Ames, Sched. Orch. 4:19. 1923; loc. cit. 7:26, *fig. 4* and *t. 8.* 1924.

Erect, caespitose, epiphytic herbs up to about 5 dm. tall. Secondary stems up to about 3 dm. long and 0.4 cm. in diameter, covered with closely appressed sheaths which may be scurfy, the sheaths disintegrating with age. Leaves 4–20 cm. long and 0.8–6 cm. broad, narrowly elliptic to broadly lanceolate, acute or obtuse, coriaceous. Inflorescence a few- to many-flowered fascicle. Dorsal sepal 5.5–8 mm. long and 2–3 mm. broad, lanceolate to oblong-lanceolate, obtuse. Lateral sepals 4.5–7 mm. long and 2–2.8 mm. broad, broadly lanceolate, obtuse

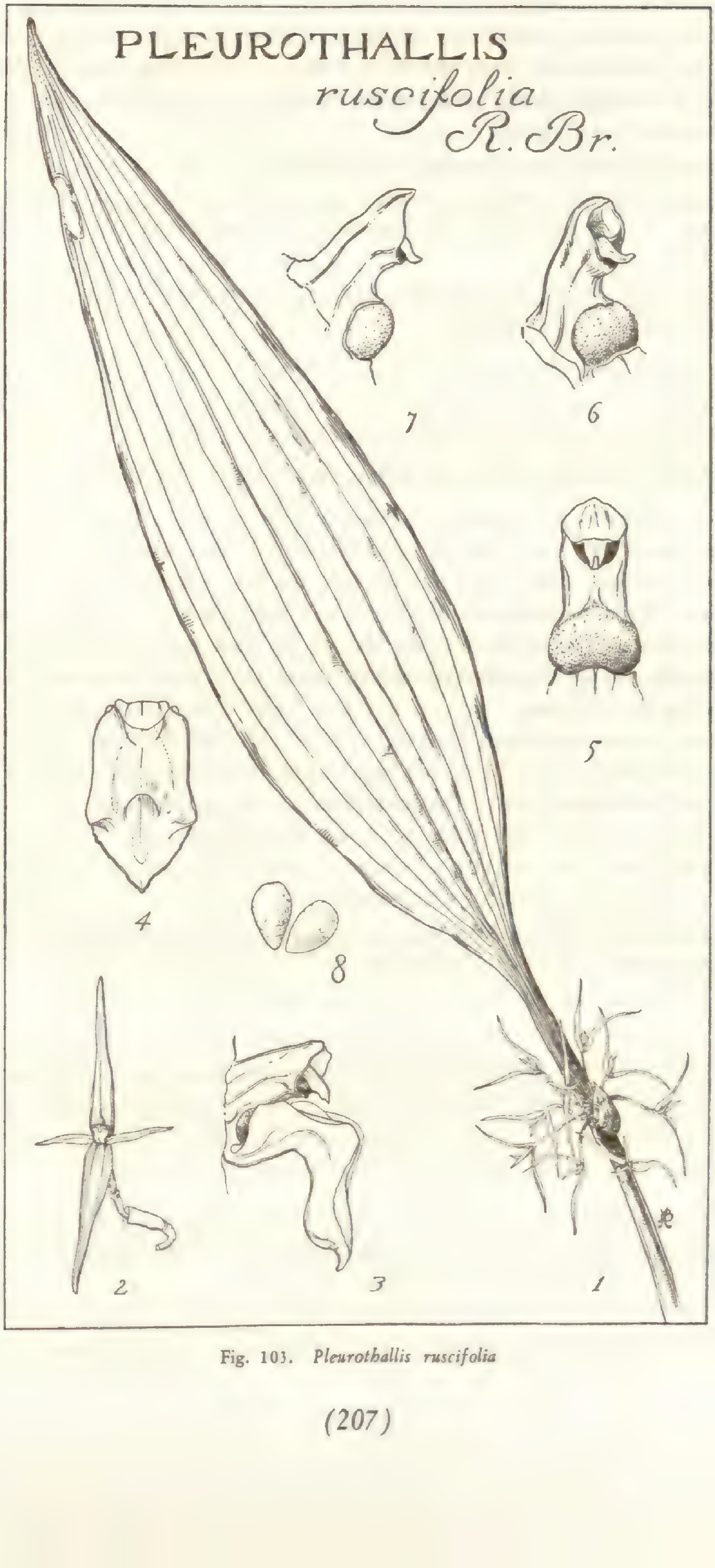


Fig. 103. *Pleurothallis ruscifolia*

or acute, usually arcuate, connate at the base and forming a short mentum. Petals 4–8 mm. long and 1.5–2.2 mm. broad, lanceolate, obtuse or acute, somewhat arcuate. Lip 2–3 mm. long and 0.8–1.3 mm. broad, oblong to oblong-ovate, obtuse, short-clawed, with 2 submarginal, elongated, sublamellate calluses which are about as long as the lip.

Costa Rica and Panama; possibly also Honduras.

CHIRIQUÍ: "Province of Chiriquí," *Powell 252, 3432.* COCLÉ: hills north of El Valle de Antón, alt. 1000 m., *Allen 2719.* PANAMÁ: hills above Campana, alt. 600–800 m., *Allen 1881.*

Allen 2719 consists of a fine series of plants which show that *P. cerea* is only a robust phase of *P. octomeriae.*

19. PLEUROTHALLIS UNCINATA Fawc. in Jour. Bot. 33:12. 1895; Fawc. & Rendle, Fl. Jam. 1:63, *t. 10.* 1910; C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 7:151. 1939.

Pleurothallis Alexandrae Schltr. in Fedde Rep. Sp. Nov. Beih. 19:103. 1923.

Tall, rather coarse, subcaespitose, epiphytic herbs up to 5.5 dm. tall. Secondary stems up to about 3.5 dm. long, covered with several loose, ancipitous, chartaceous sheaths which soon disintegrate. Leaves 8–22 cm. long and 1–5 cm. broad, linear-elliptic to oblong-lanceolate, acute, coriaceous. Inflorescence a 1- to few-flowered fascicle with the flowers on long pedicels. Dorsal sepal 10–20 mm. long and 4–6 mm. broad, linear-oblanceolate to oblong, acute or obtuse, puberulent dorsally. Lateral sepals 12–20 mm. long and 3–4 mm. broad, linear-lanceolate to oblong-lanceolate, acute, puberulent on both sides. Petals 5–9 mm. long and 1.3–2.5 mm. broad, oblanceolate, acuminate, denticulate above, 3-nerved. Lip 6–8 mm. long and 2.5–3 mm. broad, oblong-ovate, usually subpandurate, obtuse, with two narrow, falcate lateral lobes above the base, typically with thick calluses near the base of the lateral lobes and without a retrorse callus at the base. (Cf. note below.)

Costa Rica, Panama, and the West Indies.

CHIRIQUÍ: Boquete, alt. about 1800 m., *Davidson 220* (sterile specimen). COCLÉ: Valle de Antón, alt. about 800 m., *Cope s. n.*

Schweinfurth, loc. cit., has reduced *P. Alexandrae* Schltr. to *P. uncinata* without comment. Adequate material may prove that it is distinct and that the Cope specimen should be referred there. The lip on the Cope specimen is relatively small, has a prominent retrorse callus at the base (which typical *P. uncinata* lacks), and is membranaceous at the base of the side lobes (while in *P. uncinata* a large callus is situated at the base of each of the side lobes).

20. PLEUROTHALLIS TRIBULOIDES (Sw.) Lindl. Gen. & Sp. Orch. Pl. 6. 1930.

Epidendrum tribuloides Sw. Nov. Gen. & Sp. Pl. Prodr. 123. 1788.
Pleurothallis fallax Reichb. f. in Bonplandia 3:224. 1855.
Cryptophoranthus acaulis Kränzl. in Fedde Rep. Sp. Nov. Beih. 34:232. 1925.

Small, caespitose, epiphytic herbs up to 8 cm. tall. Secondary stems about 1

cm. long, covered with loose, chartaceous bracts, slender. Leaves 2–7 cm. long and 0.4–1.4 cm. broad, narrowly to broadly oblanceolate, obtuse, attenuated into a petiole at the base, coriaceous. Inflorescence a fascicle of 1–few brick-red flowers. Dorsal sepal 5–7 mm. long and 2–2.2 mm. broad, oblong-lanceolate or oblong-oblanceolate, acute, papilliferous, constricted just above the base. Lateral sepals often connate to their apices, 4.5–7.5 mm. long and about 3 mm. broad, oblong or oblong-lanceolate, acute, cucullate, papilliferous. Petals 2.5–3 mm. long and 1.2–1.4 mm. broad, oblong-oblanceolate, oblique, lobulate, acute, fleshy especially toward the apex. Lip 2.5–3 mm. long and 0.7–1.5 mm. broad, oblong or oblong-lanceolate, lobulate below the middle, obscurely ciliate toward the apex. Capsule echinate.

Mexico, British Honduras, Guatemala, Honduras, Costa Rica, Panama, and the West Indies.

CHIRIQUÍ: banks of Caldera River, alt. 1360 m., *Powell 237, 3376.*

21. PLEUROTHALLIS HISPIDA L. Wms. in Ann. Missouri Bot. Gard. 27:277, *pl. 33, figs. 1–4.* 1940.

Cryptophoranthus Powellii Ames, Sched. Orch. 4:8. 1925, non *Pleurothallis Powellii* Schltr.

Fig. 104. *Pleurothallis hispida*

Small, caespitose, epiphytic herbs up to about 5 cm. tall. Secondary stems 0.5–2 mm. long, shorter than the leaves, with 2 or 3 cauline bracts, the upper infundibuliform, maculate with maroon dots and hispid at least along the angles. Leaves 1–3.5 cm. long and 0.3–1.3 mm. broad, narrowly elliptic to elliptic-oval, obtuse, coriaceous, margins hispid or hispidulous. Inflorescence a one- to few-flowered fascicle. Dorsal sepal connate with the laterals for half its length, 5–6 mm. long, lanceolate, acute, hispidulous dorsally. Lateral sepals about 6 mm. long and together about 6 mm. broad, connate to their tips, strongly cucullate, in natural position calceolate, carinate, hispidulous dorsally and papillose within. Petals about 4 mm. long and 1 mm. broad, linear-oblong, the apex obliquely truncate and acute. Lip about 3 mm. long and 1.5 mm. broad, unguiculate; lamina oblong-lanceolate, with a lamellate callus extending from each lateral

angle toward the apex and with a mammillate callus at the junction of the lamina and the claw, apical margins entire or denticulate; claw about 0.5 mm. long, minutely biauriculate at the base.

Endemic in Panama.

COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 782, 1243*. PANAMÁ: San Juan, *Powell 278*.

22. PLEUROTHALLIS BRIGHAMII S. Wats. in Proc. Am. Acad. 23:285. 1888; Ames, Sched. Orch. 7:19, *t. 7*. 1924.

Pleurothallis barboselloides Schltr. in Fedde Rep. Sp. Nov. Beih. 17:18. 1922; loc. cit. 59: *t. 29, fig. 113*. 1931.

Pleurothallis periodica Ames, loc. cit. 7:21, *t. 4*. 1924.
Pleurothallis acrisepala Ames & Schweinf. Sched. Orch. 8:22. 1925.

Fig. 105. *Pleurothallis Brighamii*

Small, caespitose, epiphytic herbs up to 12 cm. tall. Secondary stems up to about 6 mm. long, very short and inconspicuous, enclosed by sheaths. Leaves 1.8–9 cm. long and 0.3–1.2 cm. broad, oblanceolate to linear-oblanceolate, obtuse or acute, attenuated to the base, coriaceous. Inflorescence a 1- to several-flowered fascicle borne on a long slender peduncle, up to 12 cm. long, subequal to or exceeding the leaves. Flowers small, opening one at a time. Sepals connate for a short distance at the base; dorsal sepal 6–10 mm. long and 1.2–3 mm. broad, elliptic to oblong-lanceolate, obtuse to acuminate. Lateral sepals 6–9 mm. long and together 3–4.5 mm. broad, oblong to oblong-ovate, connate to the middle or beyond, acute. Petals 2–3.5 mm. long and 0.75–1.7 mm. broad, obliquely spatulate to obliquely oval, the anterior margin produced, acute or acuminate. Lip 2.1–4 mm. long and 0.8–2 mm. broad, oblong-ligulate to oblong-lanceolate, obtuse, the apex ciliate or denticulate, with an auriculate lateral lobe on either side near the base of the lamina, claw with a prominent callus.

A not uncommon plant at low elevations from Guatemala to Panama.

BOCAS DEL TORO: without locality, *Wedel 185*; Isla Colón, *Wedel 486*. CANAL ZONE: Barro Colorado Island, *Kenoyer 256, Shattuck 205, 567*; drowned forest between Tumba Vieja and Salamanca, *Steyermark & Allen 16750*; Salamanca Hydrographic Station, *Woodson, Allen & Seibert 1585*; hills east of or near Panama City, alt. near sea-level, *Powell 92, 219*; Gatún Lake, *Powell 275*. DARIÉN: vicinity of El Real, alt. about 15 m., *Allen 943*. PANAMÁ: Río La Maestra, alt. 0–25 m., *Allen 54*; Río Tecúmen, north of Chepo Road, alt. about 30 m., *Hunter & Allen 225*; near Tapia River, Juan Díaz region, *Maxon & Harvey 6699*; Casa Ladre, San Juan, hills east of Panama City, *Powell 274, 275, 420, 3508*.

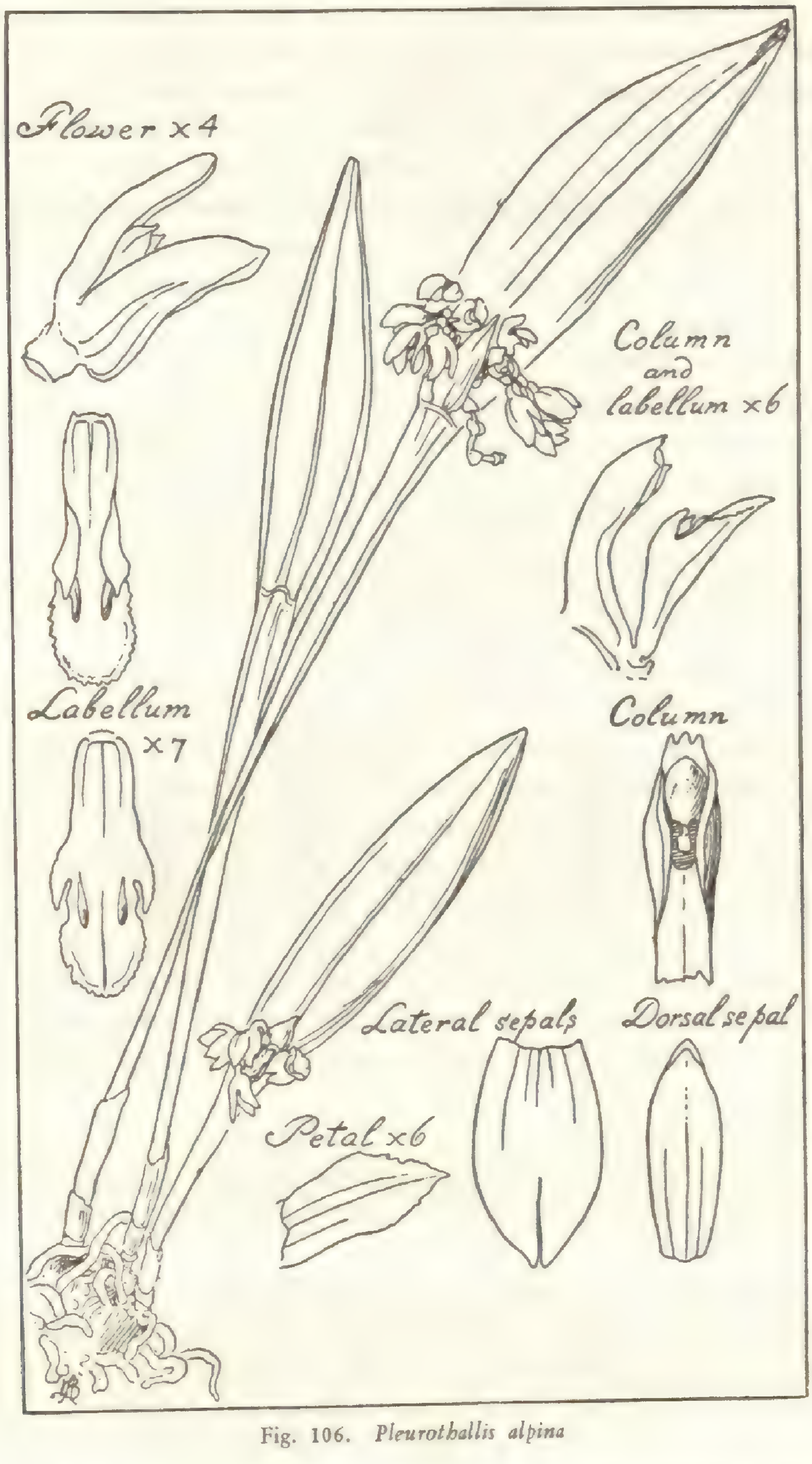


Fig. 106. *Pleurothallis alpina*

Pleurothallis Brighamii is a variable species which may eventually prove to be the same as *P. pyrsodes* Reichb. f.

23. PLEUROTHALLIS FULGENS Reichb. f. in Gard. Chron. n. s. 4:516. 1875.

Small, caespitose, epiphytic herbs up to about 10 cm. tall. Secondary stems up to about 1 mm. long. Leaves 4–8.5 cm. long and 1–1.8 cm. broad, elliptic to broadly oblanceolate, attenuated into a petiole at the base. Inflorescence a single

flower or a few-flowered fascicle borne on a long slender peduncle, about as long as or exceeding the leaves. Dorsal sepal 8–9 mm. long and about 3.5 mm. broad, ovate-lanceolate, acuminate, somewhat cucullate. Lateral sepals 10–12 mm. long, connate nearly to the middle, the bases gibbous; free part of the sepals about 6–7 mm. long and 3 mm. broad, lanceolate, acute or acuminate. Petals about 4 mm. long and 1.5 mm. broad, sublanceolate but oblique, produced anteriorally into an auricle at the middle, acute. Lip about 5 mm. long and 2.5 mm. broad, elliptic, obtuse, with a pair of small, erect, lateral lobes below the middle and a pair of parallel, submarginal, lamellate calluses near the middle.

Costa Rica and Panama.

CHIRIQUÍ: Cerro Horqueta, alt. 1200–1500 m., *Powell 335, 340.*

The description is based on a record of the type and the specimen cited. Specimens from Costa Rica which have been referred here are very much larger, have relatively short inflorescences, and show slight floral differences.

24. PLEUROTHALLIS GLANDULOSA Ames, Sched. Orch. 6:60. 1923.

Pleurothallis vittariifolia Schltr. in Fedde Rep. Sp. Nov. Beih. 19:26. 1923.

Small, caespitose, epiphytic herbs up to about 5 cm. tall. Secondary stems 1 mm. long or less. Leaves 1.5–2.5 cm. long and 0.1–0.2 cm. broad, obtuse, attenuated to the base. Inflorescence a single flower or a few-flowered fascicle; peduncle slender, puberulent, up to about 4 cm. long, exceeding the leaves. Pedicel and ovary up to about 1 cm. long, puberulent. Dorsal sepal 6–9 mm. long and about 1.5 mm. broad, linear-lanceolate, acute or acuminate, puberulent and lightly keeled dorsally. Lateral sepals 6–8 mm. long and together about 2.5 mm. broad, connate to about the middle, gibbous at the base, puberulent and lightly keeled dorsally. Petals about 3 mm. long and 1.3 mm. broad, subdolabriform, cuneate at the base, oblique, apiculate. Lip about 3.5 mm. long and 1 mm. broad, unguiculate; lamina subpandurate and auriculate at the base, glandular-puberulent on the margin and upper surface.

Costa Rica and Panama.

CANAL ZONE: near Vigía and San Juan, *Dodge, Steyermark & Allen 16578.* PROVINCE NOT KNOWN (PANAMÁ OR CANAL ZONE?): Juna Grande Range, alt. near sea-level, *Powell 306, 3430*; without data, *Purdom.*

25. PLEUROTHALLIS ALPINA Ames, Sched. Orch. 5:14, *fig. 3.* 1923.

Caespitose epiphytic herbs up to about 4 dm. tall. Secondary stems slender, up to about 3 dm. long, prominently 2- or 3-alate, expanded at the apex and the wings passing into the leaves. Inflorescence a raceme or fascicle of racemes, few-flowered, short, not half as long as the leaf. Leaves 5–12 cm. long and 0.6–2.5 cm. broad, ligulate to elliptic-lanceolate or elliptic-oblanceolate, acute or obtuse, coriaceous. Sepals acute, fleshy, obscurely puberulent dorsally; dorsal sepal 6–6.5 mm. long and 1.5–2.5 mm. broad, elliptic to oblong-oblanceolate, cucullate; lateral sepals 5–6 mm. long and 1.5–2 mm. broad, lanceolate, arcuate. Petals about 2.5 mm. long and 1–1.2 mm. broad, elliptic-oblong, acute, serrulate, arcuate. Lip 2.5–4.5 mm. long and 1.5–2 mm. broad, elliptic-oblong, obtuse, with two

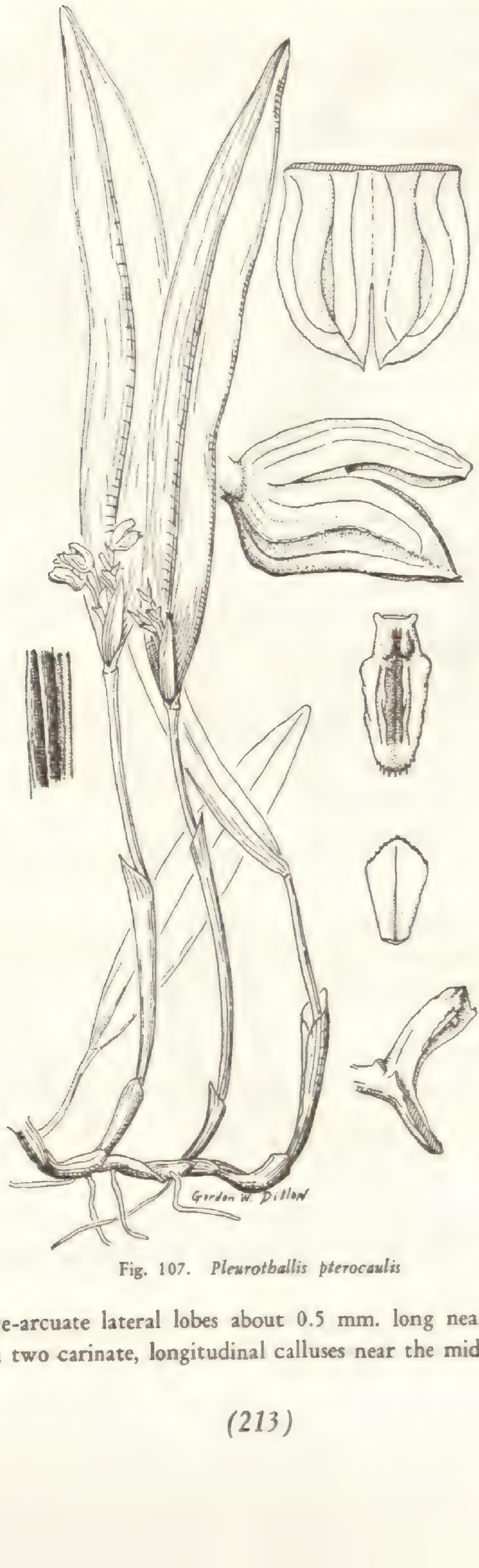


Fig. 107. *Pleurothallis pterocaulis*

small lanceolate-arcuate lateral lobes about 0.5 mm. long near the middle, apex fimbriate, with two carinate, longitudinal calluses near the middle of the disc.

Costa Rica and Panama.

CHIRIQUÍ: Caramillia, alt. 1360 m., *Powell 282.* COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 1238;* hills north of El Valle de Antón, alt. about 800–1000 m., *Allen 2289.*

A not uncommon species which is allied to *P. sicaria* Lindl.

26. PLEUROTHALLIS PTEROCAULIS L. Wms. in Ann. Missouri Bot. Gard. 27:280, *t. 32, figs. 1–7.* 1940.

Repent epiphytic herbs up to about 16.5 cm. tall. Secondary stems 2.5–7 cm. long, winged or strongly angled (at least when dry), shorter than the leaves. Leaves 4–11 cm. long and 1–1.5 cm. broad, elliptic to elliptic-lanceolate, acute, coriaceous. Inflorescence a fascicle of one- to few-flowered racemes, shorter than the leaves. Dorsal sepal about 6 mm. long and 2–2.5 mm. broad, oblong-lanceolate, strongly cucullate, carinate with the apex thickest. Lateral sepals connate for about half or more their length, 5–6 mm. long and together about 5 mm. broad, each sepal oblong-lanceolate, somewhat oblique, acute, carinate and with a thicker carinate cushion near the outer margins. Petals about 2.5 mm. long and 1.7 mm. broad, subrhombic-obovate, the apical margin serrulate. Lip about 4 mm. long and 1.5 mm. broad, unguiculate, oblong-lanceolate, obtuse, carinate, with two inconspicuous calluses at the junction of the lamina and the claw, the claw inconspicuously biauriculate at the base.

Endemic in Panama.

COCLÉ: vicinity of El Valle de Antón, alt. 600–1000 m., *Allen 1239.*

Originally said to be closely allied to *P. hondurensis* Ames, it is probably more closely allied to *P. verecunda* Schltr.

27. PLEUROTHALLIS VERECUNDA Schltr. in Fedde Rep. Sp. Nov. Beih. 17:24. 1922.

Erect, repent, epiphytic herbs up to about 3.5 dm. tall. Secondary stems up to about 19 cm. long, terete or angled (at least when dry). Leaves 8.5–16 cm. long and 1–2.2 cm. broad, elliptic or lanceolate-ligulate, acute, coriaceous. Inflorescence a few-flowered raceme about half as long as the leaves. Dorsal sepal 5.5–7 mm. long and 1.5–2 mm. broad, lanceolate to oblong-lanceolate, acute. Lateral sepals 5.5–7 mm. long and each 1.5–2.5 mm. broad, lanceolate, acute, apex thickened, free nearly to the base. Petals 2.2–3.2 mm. long and 0.75–1 mm. broad, oblong-oblanceolate, oblique, apical half denticulate. Lip 3–3.5 mm. long and 1.5–2 mm. broad, oblong to oblong-ovate, obtuse, truncate at the shortly unguiculate base; lamina with two short auricles at the base, fleshy, with a submammillate callus at the apex of claw and two lateral callus thickenings.

Costa Rica and Panama.

CANAL ZONE: Río Indio, near mouth of Chagres River, alt. about sea-level, *Powell 91;* Barro Colorado Island, *Shattuck 722.*

Fig. 108. *Pleurothallis verecunda*

Fig. 109. *Pleurothallis lepidota*

28. PLEUROTHALLIS LEPIDOTA L. Wms. in Ann. Missouri Bot. Gard. 27:279, *pl. 32, figs. 8-12.* 1940.

Small, caespitose, epiphytic herbs up to about 2.2 dm. tall. Secondary stems about 9–12 cm. long, partially invested with 2–3 scarious sheaths. Leaves 7–10 cm. long and 3–3.5 cm. broad, elliptic to elliptic-lanceolate, short-acuminate. Inflorescence one or more few-flowered racemes, shorter than the leaves. Dorsal sepal 13–14 mm. long and about 2 mm. broad, linear-lanceolate, acute. Lateral sepals about 14 mm. long and together 12 mm. broad at their bases, subtriangular, connate nearly to their apices, acuminate or acute, carinate-winged along the mid-nerve dorsally, outer surface papilliferous. Petals about 5 mm. long and 0.25 mm. broad, linear, acute. Lip about 8 mm. long and 5 mm. broad, unguiculate, obscurely 3-lobed, upper surface lepidote-verrucose, with a mammillate callus at the junction of the lamina and the claw, margins serrulate to serrate; lateral lobes 2 mm. long and as broad, rounded; mid-lobe oblong-lanceolate, acute, about 4–5 mm. long and 2 mm. broad.

Panama.

CHIRIQUÍ: Llanos del Volcán, alt. about 1300 m., *Allen 1552.*

29. PLEUROTHALLIS COGNIAUXIANA Schltr. in Fedde Rep. Sp. Nov. 3:246. 1907.

Repent or caespitose epiphytic herbs up to about 3.2 dm. tall. Secondary stems up to about 19 cm. long, slender, naked or with 1–2 sheaths at the base, with 2–3 narrow but prominent wings. Leaves 8–15 cm. long and 3–9 cm. broad, elliptic-lanceolate to ovate-lanceolate. Inflorescence 1 or more short racemes up to half as long as the leaves. Dorsal sepal 9–11 mm. long and 3–4.5 mm. broad, elliptic-obovate, obtuse or acute, slightly verrucose within. Lateral sepals 5–7.5 mm. long and together 5–7 mm. broad, suborbicular, connate to their apices or nearly so, slightly verrucose within. Petals 3.5–4.5 mm. long and 1.5–2.4 mm. broad, lanceolate-subrhombic, acute, terminal half denticulate. Lip 4–5 mm. long and 2–3 mm. broad, subrhombic, unguiculate, with two inflexed auricles or lateral lobes below the middle and two auricles at the base of the claw, surface of the apical half verrucose and the margin denticulate, with 2 parallel callus thickenings near the middle.

Costa Rica and Panama.

CHIRIQUÍ: vicinity of "New Switzerland," alt. 1800–2000 m., *Allen 1383;* Bajo Chorro, alt. 1800 m., *Davidson 109, 382.*

30. PLEUROTHALLIS VITTATA Lindl. in Bot. Reg. 24: Misc. p. 73. 1838; L. Wms. in Ann. Missouri Bot. Gard. 26:280. 1939.

Pleurothallis polystachya Rich. & Gal. in Ann. Sci. Nat. III, 3:16. 1845.
Pleurothallis mandibularis Kränzl. in Vid. Medd. Naturh. Foren. 71:169. 1920.
Pleurothallis Bourgeaui Kränzl. in Ark. f. Bot. 16^{8}:15. 1920.

Repent or caespitose epiphytic herbs up to about 2.5 dm. tall. Secondary stems up to 15 cm. long, prominently angled, at least when dry. Leaves 5–12 cm. long and 1–2.3 cm. broad, lanceolate to elliptic-ligulate, acute or obtuse,

coriaceous. Inflorescence 1–several short racemes, ⅔ as long as the leaves or less. Sepals densely puberulent dorsally; dorsal sepal 5–8 mm. long and 1.5–2 mm. broad, oblanceolate, acute; lateral sepals 5–8 mm. long and together 3–5 mm. broad, ovate or oblong-ovate, connate to their apices, slightly gibbous at the base. Petals 2.2–2.7 mm. long and 1.2–1.5 mm. broad, obovate, acute or obtuse, serrulate above. Lip 2–3 mm. long and 1.2–1.5 mm. broad, oval, obtuse, denticulate above, unguiculate, with 2 small inflexed, crescent-shaped lateral lobes near the middle of the lip and 2 auricles at the base of the claw; lamina with 2 parallel callus-like thickenings near the middle.

Mexico, Guatemala, Honduras, Costa Rica, Panama, and possibly Venezuela.

COCLÉ: hills south of El Valle de Antón, alt. 700 m., *Allen 2513;* between Las Margaritas and El Valle, *Woodson, Allen & Seibert 1282.*

31. PLEUROTHALLIS VELATICAULIS Reichb. f. in Linnaea 22:824. 1849.

Pleurothallis Pittieri Schltr. in Fedde Rep. Sp. Nov. 3:247. 1907.

Small to large, caespitose, epiphytic herbs up to about 6 dm. tall. Secondary stems up to 4 dm. long, slender to stout, partly to entirely covered with loose sheaths. Leaves extremely variable, 8–22 cm. long and 1.2–9 cm. broad, oblanceolate-ligulate to oval, attenuated into a petiole at the base. Inflorescence a raceme or fascicle of racemes, shorter than the leaf. Dorsal sepal 3–5.5 mm. long and 1.2–1.8 mm. broad, lanceolate or lanceolate-oblong, acute, somewhat cucullate. Lateral sepals 3.5–5 mm. long and 1–1.8 mm. broad, lanceolate, acute, lightly connate nearly to the apices but becoming free. Petals 1.5–3 mm. long and 0.5–0.75 mm. broad, oblong to oblong-oblanceolate, obtuse. Lip 1–2 mm. long and 1–1.5 mm. broad, oblong-oval to subrhombic, obtuse, with fleshy, erect, auriculate lateral lobes near the middle.

Costa Rica, Panama, the West Indies, and from Venezuela to Peru.

CHIRIQUÍ: forests between Las Palmas and top of Cerro de la Horqueta, alt. 2100–2268 m., *Pittier 3227.* COCLÉ: hills north of El Valle de Antón, alt. 1000 m., *Allen 2245.*

One of the most variable of the species of *Pleurothallis* in Panama.

32. PLEUROTHALLIS GELIDA Lindl. in Bot. Reg. 27: Misc. p. 91. 1841.

Pleurothallis chiriquensis Schltr. in Fedde Rep. Sp. Nov. Beih. 17:19. 1922.

Caespitose epiphytic herbs up to about 5.5 dm. tall. Secondary stems up to about 3.5 dm. long and about 0.4 cm. in diameter toward the base, partially covered with chartaceous sheaths. Leaves 8–23 cm. long and 1.5–7 cm. broad, elliptic-oblong to oblong-ovate, obtuse or acute, coriaceous, attenuated into a short petiole at the base. Inflorescence 1-several racemes, either shorter, subequal to, or longer than the subtending leaf, few- to many-flowered. Dorsal sepal 5–7.5 mm. long and 2–2.5 mm. broad, oblong-lanceolate, acute, cucullate, puberulent within. Lateral sepals 5–6 mm. long and each 2–2.5 mm. broad, acute, connate to the middle or nearly so, puberulent within. Petals 2.5–3.5 mm. long and 1.5–2.5 mm. broad, oblong-obovate to subrhombic, obtuse or truncate and the apex often dentate or lobulate. Lip 2–2.5 mm. long and 0.9–1.4 mm. broad, dilated from a

Fig. 110. *Pleurothallis gelida*

narrow base into an oblong-cuneate lamina, truncate, with 2 parallel, lamellate calluses near the middle.

Florida, Mexico to Panama, the West Indies, South America.

BOCAS DEL TORO: "Chiriquí," alt. 1200–1500 m., *Powell 227*.

A variable species and one of the most widespread of the genus.

Fig. 111. *Pleurothallis Rowleei*

33. PLEUROTHALLIS ROWLEEI Ames, Sched. Orch. 1:11. 1922; loc. cit. 7: *t. 18.* 1924.

Pleurothallis cucullata Ames, loc. cit. 3:5. 1923; loc. cit. 7: *t. 17.* 1924.

Caespitose or repent epiphytic herbs up to 3.5 dm. tall. Secondary stems up to 25 cm. long, slender, partially covered with one or two sheaths. Leaves 3–13

Fig. 112. *Pleurothallis praegrandis*

cm. long and 1–5.4 cm. broad, elliptic-lanceolate to ovate-lanceolate, acuminate, subcordate at the base. Inflorescence 1 to few slender racemes, shorter or rarely longer than the subtending leaf. Dorsal sepal 6–11 mm. long and 2.5–5.5 mm. broad, lanceolate to ovate-lanceolate, acute or acuminate, cucullate. Lateral sepals 7–10 mm. long and together 2.2–7 mm. broad, elliptic-oval to ovate, acute or obtuse, connate to the apices. Petals 6–8.5 mm. long and 1.2–2.5 mm. broad, subsigmoid-elliptic, denticulate, acute. Lip 2.5–4 mm. long and 1.5–2.5 mm. broad, subsagittate; the basal portion broad and fleshy; the apical portion narrowly triangular.

Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, alt. 1810 m., *Davidson.* DARIÉN: Cana-Cuasi trail, alt. 1650 m., *Terry & Terry 156.*

34. PLEUROTHALLIS PRAEGRANDIS Ames, Sched. Orch. 5:17. 1923; loc. cit. 7: *t. 17.* 1924.

Large, caespitose, epiphytic herbs up to about 12 dm. tall. Secondary stems up to about 9 dm. long. Leaf 31.5 cm. long and 20.5 cm. broad, cordate, acuminate. Inflorescence consisting of several racemes which are shorter than the leaf. Dorsal sepal 2.5–3 mm. long and about 1–1.5 mm. broad, elliptic-oblong, acute. Lateral sepals about 3.5 mm. long, connate to their apices, suborbicular, cochleate. Petals about 2 mm. long and about 1 mm. broad, oblong-spatulate, obtuse, the apex fleshy-thickened. Lip about 1 mm. long and 2.5–3 mm. broad, transversely elliptic; disc with a transversely rhombic thickening in the middle.

Panama.

DARIÉN: Cana and vicinity, alt. about 1800 m., *Williams 973.*

Description based on a photograph and a flower of the type, and the original description.

35. PLEUROTHALLIS ELLIPSOPHYLLA L. Wms. in Ann. Missouri Bot. Gard. 29:344. 1942.

Small, repent or caespitose, epiphytic herbs up to about 2 dm. tall. Secondary stems up to 9.5 cm. long, prominently angled when dry, with one or more loose sheaths covering the basal part. Leaves 4–9.5 cm. long and 0.7–2.7 cm. broad, elliptic to elliptic-oblong, acute or obtuse, coriaceous. Inflorescence of 1 to several short, few-flowered racemes, about half as long as the leaves. Dorsal sepal 9–14 mm. long and 1.5–2.5 mm. broad, narrowly lanceolate to elliptic-oblanceolate, acute or acuminate, cucullate, puberulent dorsally. Lateral sepals 10–13 mm. long and together 3–4 mm. broad, connate except at the very tip, the lamina lanceolate, acute or acuminate, pubescent dorsally, gibbous and with a mentum at the base. Petals 5.5–6.5 mm. long and 1.4–2 mm. broad, elliptic or elliptic-lanceolate, acute or acuminate, arcuate, denticulate or denticulate-lacerate toward the middle but the base and apex usually entire. Lip 4–5 mm. long and 1–1.3 mm. broad, lanceolate, acute or subaristate, biauriculate at the base, claw

Fig. 113. *Pleurothallis ellipsophylla*

short; lamina with an inconspicuous V-shaped callus on the basal ⅓.

Panama.

BOCAS DEL TORO: Maccaw Hill, Isla Colón, alt. 0–125 m., *von Wedel 560;* Río Cricamola, between St. Louis and Konkintöe, alt. about 10–15 m., *Woodson, Allen & Seibert 1884.*

36. PLEUROTHALLIS STENOSTACHYA Reichb. f. in Linnaea 18:399. 1844.

Pleurothallis myriantha Lehm. & Kränzl. in Engl. Bot. Jahrb. 26:445. 1899.
Pleurothallis Lankesteri Rolfe in Kew. Bull. 1914: 210. 1914.
Pleurothallis dubia Rich. & Gal. var. *myriantha* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:20. 1922.
Pleurothallis stenostachya Reichb. f. var. *Lankesteri* Ames, Sched. Orch. 7:31, *t. 15 pars.* 1924.

Small, caespitose, epiphytic herbs up to about 1 dm. tall. Secondary stems up to about 2 cm. long, very slender, covered with loose sheaths. Leaves long-petiolate; lamina 0.5–5 cm. long and 0.3–0.9 cm. broad, linear-elliptic to oblong-elliptic or usually oblanceolate, attenuated into the petiole; petiole very slender, 0.3–3 cm. long. Inflorescence a fascicle of short, few-flowered racemes; the flowers from greenish to brick-red and very small. Dorsal sepal 1.2–1.7 mm.

long, lanceolate-ovate to ovate, strongly cucullate, acute. Lateral sepals 1.2–1.5 mm. long and 0.5–0.75 mm. broad, segments lanceolate-ovate, acuminate, connate below the middle. Petals 1–1.5 mm. long and 0.2–0.6 mm. broad, linear-lanceolate, acute, arcuate. Lip 1.1–1.3 mm. long and 0.5–0.7 mm. broad, elliptic-oval, obtuse, glandular-puberulent above, short-unguiculate.

Mexico, British Honduras, Guatemala, Honduras, Costa Rica, and Panama.

CHIRIQUÍ: Boquete, alt. 1500 m., *Davidson 1268;* El Boquete, alt. 1000–1300 m., *Pittier 2989;* "Chiriquí," alt. 1060 m., *Powell 224;* vicinity of Boquete, alt. 1200–1500 m., *Woodson & Schery 800.*

A small-flowered and distinctive species.

37. PLEUROTHALLIS OVATILABIA Ames & Schweinf. Sched. Orch. 10:33. 1930.

Small, caespitose, epiphytic herbs up to about 8 cm. tall. Secondary stems up to about 6 mm. long, covered with scarious sheaths. Leaves 2.5–6 cm. long and 0.25–0.6 cm. broad, narrowly oblanceolate, obtuse, attenuated into a long petiole at the base. Inflorescence surpassing the leaves or rarely subequal; raceme slender, unilateral, up to about 3 cm. long. Sepals 1.5–1.8 mm. long and 0.9–1 mm. broad, subovate or oblong-ovate, acute or obtuse, cucullate. Petals 1.4–1.5 mm. long and 0.3–0.4 mm. broad, linear-lanceolate, acute, falcate. Lip 1.5–2.5 mm. long and about 1 mm. broad, ovate, acute.

Honduras, Costa Rica, and Panama.

Fig. 114. *Pleurothallis Grobyi*

CHIRIQUÍ: El Boquete, alt. 1000 m., *Pittier 2990.*

Possibly only a variety of *P. lancilabris* (Reichb. f.) Schltr.

38. PLEUROTHALLIS GROBYI Batem. ex Lindl. in Bot. Reg. 21: *t. 1797.* 1835; Hook. in Bot. Mag. 65: *t. 3682.* 1838; L. Wms. ex A. C. Sm. in Lloydia 2:172. 1939.

Pleurothallis picta Lindl. in Bot. Reg. 21: sub *t. 1797.* 1835; Lindl. loc. cit. 21: *t. 1825.* 1836.

Pleurothallis marginata Lindl. loc. cit. 24:Misc. p. 42. 1838.

Pleurothallis panamensis Schltr. in Fedde Rep. Sp. Nov. 17:140. 1921.

Pleurothallis dryadum Schltr. in Fedde Rep. Sp. Nov. Beih. 19:186. 1923, non Schltr. 1922.

Pleurothallis integrilabia Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 3:39. 1934.

Small, densely caespitose, epiphytic herbs up to about 15 cm. tall. Leaves 1.5–7 cm. long and 0.15–0.8 cm. broad, ob-

lanceolate to ovate-lanceolate to suborbicular, obtuse or acute, often marginate, attenuated into a petiole at the base. Inflorescence a few- to several-flowered raceme, usually much exceeding the leaf. Dorsal sepal 3.2–9 mm. long and 1.2–3 mm. broad, lanceolate to elliptic-ovate, acute or acuminate, cucullate. Lateral sepals 3–11 mm. long and together 1.2–3 mm. broad, lanceolate to oblong-lanceolate to ovate-lanceolate, acute or acuminate, gibbous at the base, connate to the apex or nearly so. Petals 1.5–2.5 mm. long and 0.4–0.8 mm. broad, ovate-oblanceolate or nearly so, acute or obtuse, more or less oblique. Lip 2–3 mm. long and 0.6–1.3 mm. broad, oblong, obtuse, short-unguiculate.

Mexico to Panama, the West Indies and in South America.

CANAL ZONE: Quebrada Lopez, *Allen 2137;* Barro Colorado Island, *Aviles 55; Shattuck 226, 546; Standley 31499, 41176;* near Vigia and San Juan, alt. 66 m., *Dodge, Steyermark & Allen 16526;* around Gamboa, alt. 2–100 m., *Pittier 4787;* hills north of Frijoles, *Standley 27665;* Salamanca Hydrographic Station, alt. about 80 m., *Woodson, Allen & Seibert 1560, 1580.* CHIRIQUÍ and VERAGUAS: auf Pampasbäumen, *Wagner 24.* COLÓN: Río Indio, alt. near sea-level, *Pittier 4264.* PANAMÁ: Río La Maestra, alt. 0–25 m., *Allen 53;* hills east of Panama City, *Powell 106.*

Pleurothallis Grobyi is quite a variable and widespread species. It is found mostly near sea-level, rarely as high as 900 meters.

39. PLEUROTHALLIS CALYPTROSTELE Schltr. in Fedde Rep. Sp. Nov. Beih. 19:23. 1923; L. Wms. in Ann. Missouri Bot. Gard. 27:276, *t. 33, figs. 11-15.* 1940.

Pleurothallis biflora Schltr. loc. cit. 181, non Focke.
Pleurothallis geminiflora Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 3:39. 1934.

Fig. 115. *Pleurothallis calyptrostele*

Small, repent or caespitose, epiphytic herbs up to about 3 cm. tall. Secondary stems about 2–3 mm. long, covered with scarious sheaths. Leaves 5–15 mm. long

and 1–4 mm. broad, oblanceolate, obtuse, attenuated into a petiole at the base. Inflorescence a few-flowered raceme, longer than the leaves. Dorsal sepal 4–5.5 mm. long and 1.2–1.5 mm. broad, oblong-lanceolate, acuminate. Lateral sepals 3.5–6 mm. long and 1–1.6 mm. broad, lanceolate, acuminate, arcuate, free nearly to the bases. Petals 1.8–2 mm. long and 0.5–0.6 mm. broad, oblanceolate, acute, slightly oblique. Lip 2–2.5 mm. long and 0.5–1 mm. broad, narrowly oblong, obtuse.

Costa Rica and Panama.

COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 1233*.

40. PLEUROTHALLIS FUEGII var. **echinata** L. Wms., var. nov.[1]

Small, caespitose, epiphytic herbs up to about 4 cm. tall. Secondary stems very short, up to about 3 mm. long, covered with loose sheaths. Leaves 10–17 mm. long and 3–6 mm. broad, oval to oblong-obovate, obtuse, attenuated into a slender petiole at the base. Inflorescence exceeding the leaves, a simple few-flowered raceme. Dorsal sepal 8–9 mm. long and 1.5–2 mm. broad, lanceolate, long-acuminate. Lateral sepals connate to about the middle, about 7–9 mm. long and together about 3 mm. broad, the segments lanceolate, long-acuminate. Petals 2.5–3 mm. long and 0.6–1 mm. broad, oblong-lanceolate, obtuse. Lip about 3.5 mm. long and about 1.5 mm. broad, short-unguiculate, oblong-ovate, obtuse, constricted toward the middle. Ovary echinate.

Endemic in Panama.

CHIRIQUÍ: Volcán de Chiriquí, alt. about 2720 m., *Davidson 981* (TYPE in Herb. Ames).

The variety *echinata* differs from the species in having an echinate ovary, narrower petals, larger flowers, and larger leaves. The material is not as good as might be desired, and more adequate material may show it to be a distinct species.

41. PLEUROTHALLIS ARISTATA Hook. in Ann. & Mag. Nat. Hist. 2:329, *t. 15*. 1839.

Pleurothallis dichotoma Ames, Sched. Orch. 6:58. 1923, non Schltr.
Pleurothallis divexa Ames, loc. cit. 7:20, *t. 5*. 1924.

Small, caespitose, epiphytic herbs up to about 7 cm. tall. Secondary stems very short, 1–3 mm. long. Leaves 8–24 mm. long and 1.5–4.5 mm. broad, oblong to oblanceolate, obtuse, attenuated into a petiole at the base. Inflorescence much exceeding the leaves, a fractiflex raceme with relatively few flowers. Dorsal sepal 4.5–9 mm. long and 1–1.8 mm. broad, lanceolate to ovate-lanceolate, aristate-acuminate, cucullate. Lateral sepals 4.5–9 mm. long and 1–1.6 mm. broad, lanceolate, aristate-acuminate, connate about 1 mm. at the base. Petals about 2–3 mm. long and 1–1.5 mm. broad, lanceolate-ovate to ovate, acute or acuminate, fimbriate or lacerate-fimbriate. Lip 2–3 mm. long and 0.6–1.5 mm. broad, ob-

[1]Herbae parvae caespitosae epiphyticae usque ad 4 cm. altae. Folia ovalia vel oblongo-ovata, obtusa. Sepalum dorsale lanceolatum, acuminatum. Sepala lateralia usque ad medium connata, lanceolata, acuminata. Petala oblongo-oblanceolata, obtusa. Labellum oblongo-ovatum, obtusum. Ovarium echinatum.

long, obtuse, subauriculate at the base, with 2 erect side lobes, keeled on the mid-nerve below, apical half of lip more or less fleshy and terete, lepidote-verrucose.

Costa Rica, Panama, and the West Indies.

CHIRIQUÍ: Bajo Chorro, alt. 1800 m., *Davidson 187*.

The specimen upon which this record is based is unsatisfactory but perhaps it belongs to this species.

42. PLEUROTHALIS PRUINOSA Lindl. in Bot. Reg. 28: Misc. p. 75. 1842.

Pleurothallis pauciflora Schltr. in Fedde Rep. Sp. Nov. Beih. 19:192. 1923.

Small, caespitose or repent, epiphytic herbs up to about 14 cm. tall. Secondary stems slender, usually with but one sheath, longer than the leaves. Leaves 1–5 cm. long and 0.4–0.7 cm. broad, linear-elliptic to linear-lanceolate (rarely broader), acute or obtuse, coriaceous. Inflorescence a slender, few-flowered raceme, subequal to or exceeding the leaves (rarely shorter). Dorsal sepal 2.5–4 mm. long and 1.5–1.8 mm. broad, lanceolate to ovate-lanceolate, acute or acuminate, cucullate. Lateral sepals 2.5–4 mm. long and together 1.5–2.5 mm. broad, ovate or ovate-lanceolate, cochleate, connate to their apices. Petals 2–3 mm. long and 0.3–0.5 mm. broad, linear or linear-lanceolate, acute. Lip 1.5–2 mm. long and 0.8–1 mm. broad, ovate-lanceolate to triangular-lanceolate, acute or acuminate, fleshy.

Honduras, Costa Rica, Panama, the West Indies, Surinam, French Guiana, and possibly Peru.

CHIRIQUÍ: Boquete, alt. 1150 m., *Davidson 708;* Chiriquí, alt. 1200 m., *Powell 434*.

A variable species. The Central American material is usually smaller than that from the West Indies.

43. PLEUROTHALLIS MACRANTHA L. Wms. in Ann. Missouri Bot. Gard. 28:417, *pl. 21, figs. 1-6.* 1941.

Caespitose, epiphytic or terrestrial herbs up to 23 cm. tall. Secondary stems 6–8 cm. long, subequal to the leaves in length on mature plants, almost completely invested with one or two loose, scarious sheaths, unifoliate. Leaves 4–7 cm. long and 1.5–2.8 cm. broad, elliptic, obtuse, coriaceous. Inflorescence a several-flowered raceme, about twice exceeding the subtending leaves; sheath at the base of the peduncle short, about 9–11 mm. long; bracts 6–7 mm. long, ovate-lanceolate, scarious, semiamplexicaul. Dorsal sepal 16–20 mm. long and 6–8 mm. broad, elliptic to oblanceolate-elliptic, acute, 3-nerved, keeled dorsally along the mid-nerve. Lateral sepals 16–18 mm. long and together 6–8 mm. broad, connate almost to their apices, oblong-oblanceolate, acute, together 4-nerved, somewhat gibbous at the base. Petals about 9–11 mm. long and 5–6 mm. broad near the apex, oblong-obovate, slightly oblique, truncate or slightly retuse, 3-nerved, with an inconspicuous cushion-like callus near the base. Lip 10–12 mm. long and 3–4 mm. broad toward the apex when expanded, about 2 mm. broad near the middle and 3 mm. broad across the auriculate base, subterete, and sulcate above, somewhat

laterally compressed, expanding toward the apex and into two auricles at the base, with three small calluses between the basal auricles.

Endemic in Panama.

CHIRIQUÍ: Bajo Chorro, alt. 1900 m., *Woodson & Schery 666*.

A very large-flowered species of *Pleurothallis*.

44. PLEUROTHALLIS TUERCKHEIMII Schltr. in Fedde Rep. Sp. Nov. 10:292. 1912. *Pleurothallis megachlamys* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:108. 1923.

Caespitose epiphytic herbs up to about 7.5 dm. tall, but usually about 3 dm. tall. Secondary stems 5.5–42 cm. long, usually provided with 1–2 loose, ancipitous, brown, chartaceous sheaths. Leaves 8–27 cm. long and 2.5–7.5 cm. broad, elliptic to oval, obtuse or rarely acute, attenuated into a short petiole at the base, either longer or shorter than the secondary stem, usually shorter than the inflorescence or occasionally subequal. Inflorescence an erect raceme which usually exceeds the leaves, the flowers among the largest of the genus; sheath up to about 9 cm. long, conspicuous. Dorsal sepal 11–25 mm. long and 4–6 mm. broad, lanceolate, acute or acuminate, cucullate, puberulent dorsally. Lateral sepals connate nearly to their apices, 14–25 mm. long and 6–7 mm. broad, elliptic to oblong-lanceolate, acute, puberulent dorsally. Petals 4.5–8 mm. long and 2.5–4 mm. broad, oblong-oval to oval, arcuate, verrucose and subcochleate toward the apex. Lip 5–9 mm. long and about 3–3.5 mm. broad, auriculate at the base, the auricles erect; lamina ligulate, rostrate, fleshy, smooth or verrucose.

Mexico, Guatemala, Costa Rica, and Panama.

CHIRIQUÍ: upper Río Chiriquí Viejo, alt. 1300–1900 m., *White & White 18;* vicinity of Monte Lirio, alt. 1300–1900 m., *Seibert 142*.

45. PLEUROTHALLIS POWELLII Schltr. in Fedde Rep. Sp. Nov. Beih. 17:22. 1923.

Large (for genus), caespitose, epiphytic herbs up to about 7 dm. tall. Secondary stems up to probably 35 cm. long. Leaves 20–25 cm. long and 7–9 cm. broad, oblong-elliptic to ovate-lanceolate, obtuse or acute. Inflorescence several- to many-flowered, exceeding the leaves in length. Sepals all slightly connate at the base, the laterals connate nearly to their apices; dorsal sepal 12–20 mm. long and 2–2.5 mm. broad, ligulate or lanceolate, acute or acuminate; lateral sepals 14–20 mm. long and 6–7 mm. broad, oblong-lanceolate to lanceolate-ovate, cymbiform, acute. Petals about 6 mm. long and 1.6–2.6 mm. broad, oblanceolate to oblong-oblanceolate, obtuse, falcate. Lip about 5 mm. long and 2–2.5 mm. broad, lanceolate-ovate, obtuse, very fleshy, with 2 upright carinate wings above, one on either side and one dorsally.

Costa Rica (?), and Panama.

CHIRIQUÍ: "Chiriquí," alt. 1100–1200 m., *Powell 146, 3365*.

One of the largest species of *Pleurothallis* in Panama. Known only from one collection, with field number and garden number—a numbering often practiced by Mr. Powell, whose field numbers were rarely used on specimens and then always in conjunction with the garden numbers.

46. PLEUROTHALLIS SEGOVIENSIS Reichb. f. in Bonplandia 3:223. 1855; C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 4:96. 1937.

Pleurothallis Wagneri Schltr. in Fedde Rep. Sp. Nov. 17:141. 1921.
Pleurothallis falcatiloba Ames in Proc. Biol. Soc. Wash. 34:152. 1921.
Pleurothallis canae Ames, Sched. Orch. 2:18. 1923; loc. cit. 7: *t. 13*. 1924.

Caespitose epiphytic herbs 3–22 cm. tall, ordinarily 10–15 cm. tall. Secondary stems about 0.5–6 cm. long, covered with sheaths, much shorter than the leaves. Leaves (when mature) 4.5–12 cm. long and 0.2–1.2 cm. broad, linear-oblanceolate to oblanceolate, obtuse or rarely acutish, gradually attenuated to the base. Inflorescence a few- to several-flowered raceme, often unilateral, usually exceeding the leaves but rarely shorter. Dorsal sepal 5–11 mm. long and 2–3.5 mm. broad, lanceolate to oblong-lanceolate, acute or acuminate, cucullate, keeled dorsally, pubescent within (especially laterally) to glabrous. Lateral sepals 5.5–11 mm. long, oblong-lanceolate to suborbicular-ovate, acute, cucullate to cochleate, connate almost to their apices or rarely connate only $\frac{2}{3}$ their length, pubescent within (especially laterally) to glabrous, keeled dorsally along the mid-ribs. Petals 2–3.5 mm. long and 1–1.5 mm. broad, elliptic-lanceolate to ovate, obtuse or acute, more or less arcuate, apex rarely trilobulate, the base auriculate. Lip 3–4 mm. long and 2.5–3 mm. broad, occasionally papilliferous, 3-lobed; lateral lobes basal or subbasal, from lanceolate-falcate to subtriangular, usually erect; lamina oblong, obtuse, with 2 large lamellate or ridge-like calluses on the basal half or two thirds, and with an elongate bipartite central callus at the base.

Mexico, Guatemala, Costa Rica, and Panama.

CHIRIQUÍ: Bajo Chorro, alt. 1800 m., *Davidson 170;* Río Quebrada, alt. 1700 m., *Killip 3540;* "Chiriquí," alt. 1200–1650 m., *Powell 236, 278, 289, 3176; Wagner 25;* Monte Lirio, alt. 1300–1900 m., *Seibert 199, 212, 213, 271;* Bajo Mona, alt. 1500–2000 m., *Woodson, Allen & Seibert 1004.* COCLÉ: vicinity of La Mesa, alt. 1000 m., *Allen 2307.* DARIÉN: Cana and vicinity, *Williams 971.*

One of the most variable of the species of *Pleurothallis* in Panama. The description is taken from all of the specimens available. A critical study may show some of the forms to be varietally distinct. In addition to the Panamanian synonyms listed above the following names seem to belong here also: *Pleurothallis Aguilarii* Ames, *P. amethystina* Ames, *P. Johannis* Schltr., *P. melicoides* Schltr., *P. pompalis* Ames, and *P. vinacea* Ames.

47. PLEUROTHALLIS GHIESBREGHTIANA Rich. & Gal. in Ann. Sci. Nat. III, 3:16. 1845.

Pleurothallis racemiflora Lindl. ex Lodd. Bot. Cab. 10: *t. 949.* 1824, non (Sw.) Lindl. 1824.
Pleurothallis longissima Lindl. Folia Orch. Pleuroth. p. 31. 1859; Reichb. f. in Xenia Orch. 2:114, *t. 137, figs. 6-9.* 1867; in Saunders' Ref. Bot. 2: *t. 141.* 1882.
Pleurothallis lyroglossa Schltr. in Fedde Rep. Sp. Nov. 8:566. 1910.
Pleurothallis Niederleinii Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:396. 1918.

Caespitose or repent epiphytic herbs up to about 6 dm. tall, but usually about 3 dm. tall. Secondary stems 3–18 cm. long, usually shorter than the leaves.

Leaves 4–17 cm. long and 0.9–3 cm. broad, oblanceolate to elliptic-oblong, obtuse or rarely acute, usually attenuated into a short petiole at the base. Inflorescence a few- to usually many-flowered raceme, usually much exceeding the subtending leaves. Dorsal sepal 6–8.5 mm. long and 2.5–4 mm. broad, lanceolate to elliptic-ovate, acute. Lateral sepals 6–8.5 mm. long and together 3–5 mm. broad, elliptic-oblong to oval, acute or obtuse, connate to their apices or nearly so, cucullate. Petals 6–8.5 mm. long and 1.5–3 mm. broad, elliptic-lanceolate to ovate-lanceolate, acute or obtuse, oblique. Lip 3.5–6.5 mm. long and 1.5–3 mm. broad, oblong-pandurate, obtuse, basal portion orbicular, terminal portion oval.

Mexico, British Honduras, Guatemala, Honduras, Costa Rica, Panama, and the West Indies.

CHIRIQUÍ: Cerro Vaca, alt. 900–1136 m., *Pittier 5320*. PANAMÁ: Río La Maestra, alt. 0–25 m., *Allen 63*. VERAGUAS: Bahia Honda, *Taylor 1511*.

48. PLEUROTHALLIS DOLICHOPUS Schltr. in Fedde Rep. Sp. Nov. 10:394. 1912.

Pleurothallis lamprophylla Schltr. loc. cit. 15:205. 1918.
Pleurothallis poasensis Ames, Sched. Orch. 1:10. 1922; loc. cit. 7: *t. 12*. 1924.
Pleurothallis peregrina Ames, loc. cit. 6:67. 1923.

Caespitose or repent epiphytic herbs up to about 3.5 dm. tall. Secondary stems up to about 23 cm. long, usually exceeding the leaves. Leaves 5–15 cm. long and 1.3–3.5 cm. broad, elliptic-oblong, obtuse or rarely acute, contracted into a short petiole at the base. Inflorescence 1 or more, few- to many-flowered racemes, subequal to or usually exceeding the leaves. Dorsal sepal 14–23 mm. long and 2–3.5 mm. broad, linear-lanceolate to lanceolate, ciliate and puberulent to glabrous within. Lateral sepals 9–22 mm. long and 1.5–3 mm. broad, linear-lanceolate to lanceolate, acuminate, ciliate and puberulent to glabrous within, free almost to their bases. Petals 3–5 mm. long and 1–2 mm. broad, from nearly oblong to oblong-oblanceolate, obtuse. Lip 2.5–5 mm. long and 0.8–2.5 mm. broad, oblong to oblong-obovate, obtuse, the disc with 3 longitudinal calluses and the outer 2 serrated in front but erect and forming the side of the lip below, terminal part of the lip denticulate or entire.

Mexico, Guatemala, Costa Rica, and Panama.

CHIRIQUÍ: Volcán de Chiriquí, alt. 2875 m., *Davidson 1030;* Volcán de Chiriquí, alt. 3500–4000 m., *Woodson & Schery 392*.

Some Mexican specimens have the sepals no more than 6 mm. long, which is unusual. The normal length is about 12 mm.

49. PLEUROTHALLIS PFAVII Reichb. f. in Flora 69:555. 1886.

Masdevallia platyrachis Rolfe in Gard. Chron. III, 4:178. 1888.
Pleurothallis platyrachis Rolfe in Jour. Bot. 28:136. 1890; Hook. f. in Bot. Mag. 116: *t. 7129*. 1890.
Kraenzlinella platyrachis Rolfe in Orch. Rev. 23:326. 1915.

Caespitose epiphytic herbs up to about 30 cm. tall. Secondary stems up to about 2 cm. long. Leaves 7–20 cm. long and 1.2–3 cm. broad, ligulate-oblanceolate, obtuse, coriaceous, attenuated into a petiole at the base. Inflorescence up to

25 cm. long, exceeding the leaves; peduncle ancipitous and winged, with one or more bracts; rachis fractiflex, somewhat flattened or nearly terete, bracts large. Sepals spreading, free nearly to their bases, verrucose within except at the bases, keeled dorsally toward their apices. Dorsal sepal 13–20 mm. long and 4.5–5.5 mm. broad, lanceolate to ovate-lanceolate, acute, cucullate. Lateral sepals 13–20 mm. long and 2–4 mm. broad, lanceolate, acute, connate nearly to their apices. Petals 4–5 mm. long and about 1 mm. broad, ligulate, falcate, verrucose externally. Lip 5–6 mm. long and about 1.5 mm. broad, lanceolate, arcuate, acute, with a pair of inframarginal, lamellate calluses beginning above the base and extending nearly to the apex.

Mexico, Costa Rica, and Panama.

CHIRIQUÍ: "Chiriquí," *Pfau.*

Originally collected in Panama but not reported in recent years.

50. PLEUROTHALLIS SPECTABILIS Ames & Schweinf. Sched. Orch. 8:34. 1925.

Caespitose epiphytic herbs up to about 3 dm. tall. Secondary stems up to 1.5 cm. long, covered with loose, tubular sheaths. Leaves 6–13 cm. long and 0.6–1.5 cm. broad, elliptic-oblanceolate to oblanceolate, obtuse or acute, attenuated into a petiole at the base. Inflorescence up to 30 cm. long, much overtopping the leaves; peduncle ancipitous; rachis distichous. Sepals spreading, lanceolate, acute, densely verrucose within except at the bases. Dorsal sepal 15–21 mm. long and 5.5–7.5 mm. broad, cucullate toward the base. Lateral sepals 15–21 mm. long and 4–5.5 mm. broad, arcuate, connate at the base. Petals 3–5 mm. long and 1–1.5 mm. broad, oblong-falcate, slightly broader toward the obtuse or tridentate thickened apex, slightly verrucose. Lip 4.5–6 mm. long and about 2 mm. broad, oblong, obtuse or slightly retuse, base of lip thin, upper ⅔ somewhat fleshy and with a pair of inframarginal, lamellate calluses which extend nearly to the apex.

Costa Rica and Panama.

VERAGUAS: Santa Fé, alt. 460 m., *Powell 382.*

51. PLEUROTHALLIS MURICATA Schltr. in Fedde Rep. Sp. Nov. 10:293. 1912.

Pleurothallis sororoa Schltr. loc. cit. 294.
Pleurothallis diuturna Schltr. in Fedde Rep. Sp. Nov. Beih. 17:19. 1922; Ames, Sched. Orch. 7: *t. 19.* 1924.

Caespitose or repent, epiphytic herbs up to about 5 dm. tall. Secondary stems up to 5.5 cm. long, usually angled and sulcate. Leaves 8–17 cm. long and 1.2–4 cm. broad, oblong-ligulate, obtuse, coriaceous, somewhat attenuated to the base. Inflorescence up to 23 cm. long, peduncle and rachis terete, the rachis somewhat fractiflex and distichous, much exceeding the leaves. Sepals free nearly to their bases, fleshy, keeled along the mid-nerve dorsally. Dorsal sepal 6–18 mm. long and 4–7 mm. broad, broadly lanceolate, acute, cucullate. Lateral sepals 13–19 mm. long and 3–5.5 mm. broad, lanceolate, acute, cucullate. Petals 5–10 mm. long and 1.2–2.5 mm. broad, linear-elliptic to elliptic-oblanceolate, acute, slightly arcuate, obscurely auriculate at the base, adnate to the base of the column. Lip

6–10 mm. long and 2–3.2 mm. broad, unguiculate, ligulate, lobulate toward the base; the claw short, thin; lamina fleshy, the surface slightly muricate, arcuate, with two small, erect, lateral lobes toward the base. Ovary muricate.

Mexico to Panama, possibly Peru.

COCLÉ: vicinity of El Valle de Antón, alt. 800 m., *Allen 2294, Hunter & Allen 361.* VERAGUAS: near Santiago, alt. 150–220 m., *Powell 172.*

52. PLEUROTHALLIS CRENATA Lindl. in Gard. Chron. 6:207. 1846; Lindl. Folia Orch. Pleuroth. p. 38. 1859.

Masdevallia aperta Kränzl. in Fedde Rep. Sp. Nov. 17:430. 1921.
Pleurothallis Hunteriana Schltr. in Fedde Rep. Sp. Nov. Beih. 17:20. 1922.
Pleurothallis hamata Rolfe ex Ames, Sched. Orch. 3:8. 1923.
Pleurothallis aperta Ames, Sched. Orch. 7:17, *fig. 3.* 1924.

Small repent or caespitose herbs up to about 15 cm. tall. Secondary stems up to 1 cm. long. Leaves 4.5–13 cm. long and 1–2.7 cm. broad, broadly to narrowly oblanceolate, acute or obtuse, attenuated into a petiole at the base. Inflorescence about half as long as the leaves, 1- to several-flowered, peduncle and rachis terete. Sepals more or less spreading, minutely papilliferous within, keeled or winged along the mid-nerve dorsally, the keel or wing extending onto the ovary, the apices subterete; dorsal sepal 11–18 mm. long and about 3–3.5 mm. broad, lanceolate, cucullate; lateral sepals 12–18 mm. long and 1.5–3 mm. broad, lanceolate, acute, connate to, or nearly to, the middle. Petals 4–4.5 mm. long and 1.5–2 mm. broad, oblong-lanceolate, somewhat pandurate, acute, slightly oblique. Lip 4.5–5 mm. long and 1.5–2 mm. broad, oblong-lanceolate, obtuse or acutish, the sides erect and fleshy, disc densely papillose-verrucose.

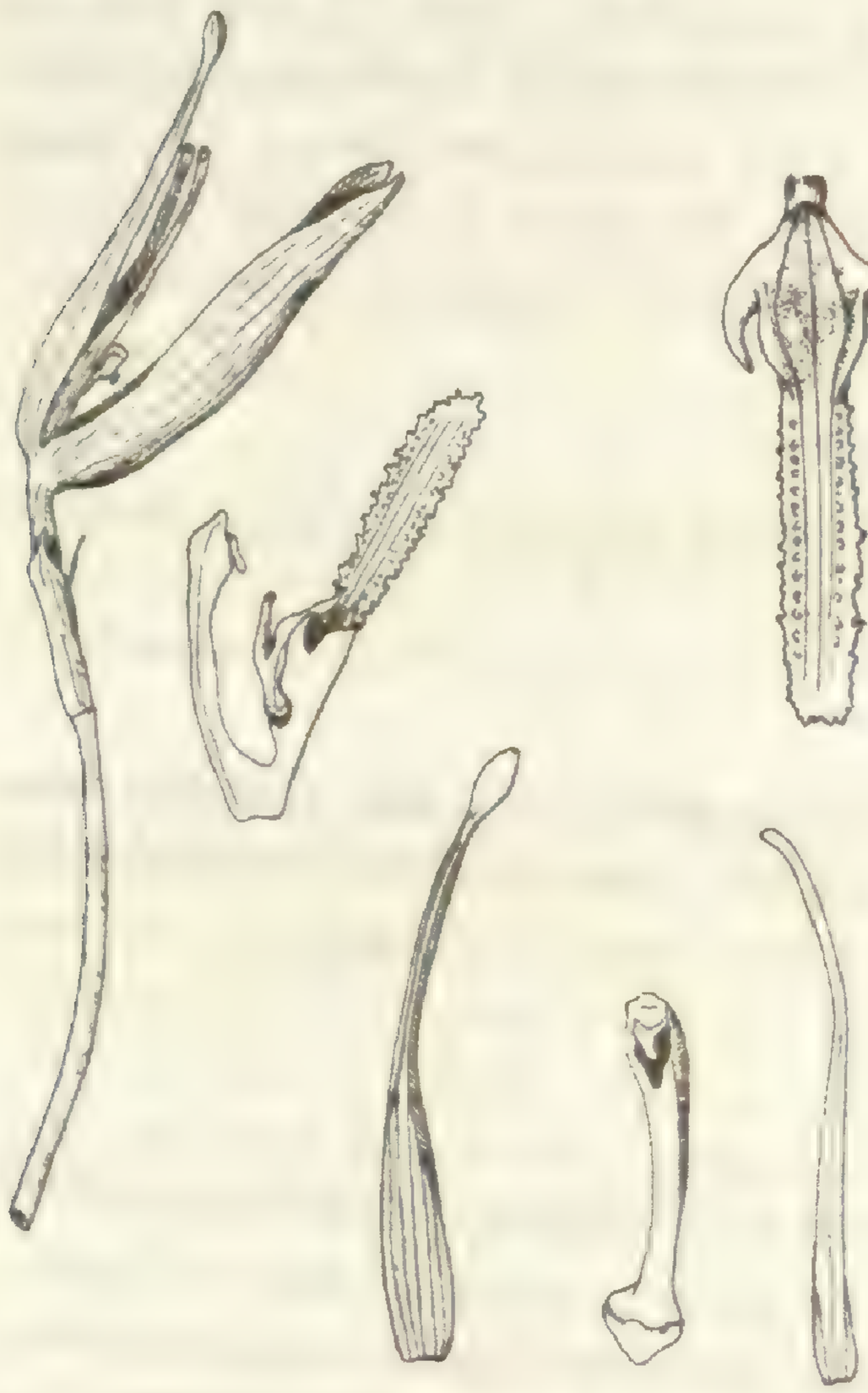


Fig. 116. *Pleurothallis filamentosa*

Mexico, Costa Rica, and Panama.

CHIRIQUÍ: without locality, alt. 1200–1500 m., *Powell 245, 277, 3436.*

53. PLEUROTHALLIS FILAMENTOSA (A. & S.) L. Wms. in Bot. Mus. Leafl. Harv. Univ. 8:144. 1940.

Restrepia filamentosa Ames & Schweinf. Sched. Orch. 8:19, *fig. 3.* 1925.

Small, caespitose, epiphytic herbs up to 12 cm. tall. Secondary stems up to about 6.5 cm. long, slender, covered with loose, chartaceous sheaths. Leaves 4–5.5 cm. long and 1–1.7 cm. broad, elliptic or elliptic-lanceolate, acute, attenuated into a short petiole at the base. Inflorescence shorter than the leaves; peduncle

slender, 1-flowered, pedicel with a short filamentose appendage on the anterior side. Dorsal sepal 13–16 mm. long and about 2 mm. broad, linear-lanceolate, the terminal half subfiliform and the apex thickened and clavate, free nearly to the base. Lateral sepals 14–16 mm. long and together 4–5 mm. broad, connate nearly to their apices, puberulent within, the lamina oblong-lanceolate, the free apices acute. Petals 10–12 mm. long, about 0.5 mm. broad, subfiliform, apices thickened and clavate. Lip about 6–7 mm. long and 2–2.5 mm. broad, 3-lobed, lanceolate-ligulate, obtuse, short-unguiculate; the basal ⅓ oval, fleshy, with a small porrect lobe near the middle on either side; terminal ⅔ linear-oblong, denticulate, the surface more or less verrucose.

Panama.

CHIRIQUÍ: Cerro Horqueta, alt. 1500–1700 m., *Powell 344.*

Very closely allied to *P. subserrata* (Schltr.) L. Wms.

54. PLEUROTHALLIS SUBSERRATA (Schltr.) L. Wms. in Bot. Mus. Leafl. Harv. Univ. 8:144. 1940.

Restrepia subserrata Schltr. in Fedde Rep. Sp. Nov. Beih. 19:291. 1923.

Small, caespitose, epiphytic herbs up to about 15 cm. tall. Secondary stems up to about 9 cm. long, covered with loose, chartaceous sheaths which disentegrate with age. Leaves 4–6 cm. long and 1.5–3 cm. broad, elliptic to ovate, obtuse, contracted into a short petiole at the base. Inflorescence as long as or exceeding the leaves; peduncle 1 or more from each stem, slender, 1-flowered. Dorsal sepal 1.6–2 cm. long and about 0.2 cm. broad, narrowly lanceolate, with the terminal half subfiliform and the apex clavellate, free nearly to the base. Lateral sepals 1.6–2 cm. long and together 0.5–0.65 cm. broad, connate nearly to their apices; the lamina oblong-elliptic, the apices acute. Petals about 1.3 cm. long, 0.75 cm. broad at the base, with a narrow, entire or denticulate lamina at the base, but the remainder subfiliform and the apex clavellate. Lip 8–10 mm. long and 2–3 mm. broad at the base, lanceolate-ligulate, acute or obtuse, short-unguiculate; the basal ⅓ oval, fleshy, with a small porrect lobe on either side near the middle; terminal ⅔ linear-oblong, serrulate, the surface slightly verrucose.

Costa Rica and Panama.

CHIRIQUÍ: vicinity of "New Switzerland," central valley of Río Chiriquí Viejo, alt. 1800–2000 m., *Allen 1384;* Bajo Chorro, alt. 2000 m., *Davidson 116.*

55. PLEUROTHALLIS XANTHOPHTHALMA (Reichb. f.) L. Wms. in Bot. Mus. Leafl. Harv. Univ. 8:144. 1940.

Restrepia xanthophthalma Reichb. f. in Hamb. Gartenzeit. 21:300. 1865.
Restrepia Lansbergii "Reichb. f.", sensu Hook. in Bot. Mag. 87: *t. 5257.* 1861.
Restrepia Powellii Schltr. in Fedde Rep. Sp. Nov. Beih. 17:25. 1922.
Restrepia Tonduzii Schltr. loc. cit. 19:291. 1923.

Caespitose epiphytic herbs up to 2 dm. tall. Secondary stems up to about 12 cm. long, slender, covered with several loose, ancipitous sheaths. Leaves 3.5–8

cm. long and 0.6–3.5 cm. broad, elliptic to lanceolate to ovate, acute or obtuse, attenuated into a short petiole at the base. Inflorescence 1- to several-flowered, very much shorter than the leaves, rarely reaching to the middle of the subtending leaf. Dorsal sepal 10–12 mm. long and 1–2 mm. broad, linear-lanceolate, becoming subfiliform above, with the apex clavellate. Lateral sepals 8–12 mm. long, together 4–6 mm. broad, connate nearly to their apices, the lamina oval to obovate. Lip 5–6.5 mm. long and 2–2.5 mm. broad, ovate-lanceolate, obtuse, with two slender lateral lobes near the base, terminal part somewhat narrowed and ciliate or denticulate.

Mexico, Guatemala, Honduras, Costa Rica, and Panama.

CHIRIQUÍ: "Chiriquí," alt. 1280 m., *Powell 123*.

EXCLUDED OR OBSCURE SPECIES

PLEUROTHALLIS BARBAE Schltr. in Fedde Rep. Sp. Nov. Beih. 19:104. 1923.

Specimens so determined belong elsewhere.

PLEUROTHALLIS PERPUSILLA Reichb. f. in Bot. Voy. Herald, 215. 1852.

Obscure, possibly a species of *Stelis*.

PLEUROTHALIS PHYLLOCARDIA Reichb. f. Beitr. Orch. Centr.-Am. 97. 1866.

The species is obscure. Specimens so determined belong elsewhere.

PLEUROTHALLIS PHYLLOCARDIOIDES Schltr. in Fedde Rep. Sp. Nov. Beih. 19:193. 1923.

A plant so determined, from Darién Province, is probably an undescribed species but the material is not good.

PLEUROTHALLIS PYROSOIDES Reichb. f. in Gard. Chron. n. s. 6:386. 1876; Schltr. loc. cit. 17:22. 1922.

The specimen reported by Schlechter is *P. Brighamii* S. Wats.

24. MALAXIS Solander ex Swartz

MALAXIS Solander ex Sw. Nov. Gen. & Sp. Pl. Prodr. 119. 1788; in Svenska Vet.-Akad. Handl. 21:233. 1800; Fawc. & Rendle, Fl. Jam. 1:41. 1910.

Achroanthes Raf. in Med. Repos. N. Y. 5:352. 1808.

Microstylis Nutt. Gen. N. Am. Pl. 2:196. 1818; Lindl. Gen. & Sp. Orch. Pl. 18. 1830; Benth. & Hook. Gen. Pl. 2:494. 1883; Pfitzer in Engler & Prantl. Nat. Pflanzenf. II, 6:130. 1888; Ridley in Jour. Linn. Soc. 24:308-351. 1888.

Small, erect or repent, terrestrial or epiphytic herbs with cormous pseudobulbs or repent stems. Section EUMALAXIS with cormous, usually hypogaeous, pseudobulbs bearing 1 or 2 leaves. Section BLEPHARIGLOTTIS with more or less elongated stems and leaves scattered along them. Leaves 1–3, continued at the base into a sheathing petiole, membranaceous, the lamina usually broad. Scape or peduncle slender, usually elongated. Inflorescence a spicate or subumbellate raceme; flowers small. Sepals free or the laterals connate, subequal, spreading. Petals equal to the sepals or usually shorter, narrow to subfiliform. Lip erect or spreading, sessile, entire or lobed, usually cordate or auriculate, with the auricles embracing the column, usually broader than the sepals, concave at the base (or plane in

Malaxis Wendlandii). Column very short, terete, usually at right angles to the axis of the lip; anther erect or suberect, persistent, 2-celled, the cells often nearly separate; pollinia 4, 2 in each cell of the anther, waxy, their long axis parallel to the long axis of the column or nearly so; caudicle none.

About 200 species distributed in the temperate and tropical regions with the greatest concentration in tropical Asia and Oceania.—A fascinating but difficult genus, closely allied to *Liparis*, and with no really good characters separating the two. The section BELPHARIGLOTTIS is entirely tropical American, and while it resembles some species of *Liparis* its characters are more those of *Malaxis*.

a. Plants with short, slender, leafy stems.
  b. Lip 5.5–9.5 mm. long; petals 4.5–7 mm. long..... 10. M. TIPULOIDES
  bb. Lip 3–4 mm. long; petals 3–3.5 mm. long..... 9. M. BLEPHARIGLOTTIS
aa. Plants with short bulbous stems which are not leafy along their length but bear 1 or 2 leaves.
  b. Leaf 1; inflorescence a narrow raceme or spike.
    c. Lip simple in front, not tridentate, trilobate, nor retuse..... 1. M. MAJANTHEMIFOLIA
    cc. Lip not simple in front, either tridentate, trilobate, or retuse.
      d. Lip obovate-triangular; anther rostrate..... 11. M. WENDLANDII
      dd. Lip not obovate-triangular; anther not rostrate.
        e. Lip tridentate at the apex; inflorescence a dense spike..... 3. M. SOULEI
        ee. Lip trilobate in front; inflorescence a sublax raceme..... 2. M. PITTIERI
  bb. Leaves 2; inflorescence a subumbellate raceme.
    c. Lip ciliate or denticulate..... 8a. M. PARTHONII var. DENTICULATA
    cc. Lip neither ciliate nor denticulate.
      d. Lip tridentate or trilobate near the apex.
        e. Lip subquadrate in outline, with linear-lanceolate basal auricles..... 6. M. WOODSONII
        ee. Lip not subquadrate in outline, without linear-lanceolate auricles.
          f. Lip without basal auricles..... 4. M. SIMILLIMA
          ff. Lip with erect or uncinate basal auricles..... 5. M. EXCAVATA
      dd. Lip entire in front.
        e. Lip suborbicular to transversely oblong-oval, 3.5–7 mm. broad..... 8. M. PARTHONII
        ee. Lip ovate-triangular to ovate-lanceolate; 1.5–2.5 mm. broad.... 7. M. FASTIGIATA

1. MALAXIS MAJANTHEMIFOLIA Cham. & Schlecht. in Linnaea 6:59. 1831; Ames & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 3:121. 1935; L. Wms. in Ann. Missouri Bot. Gard. 26:281. 1939.

Malaxis ichthiorhynca Rich. & Gal. in Ann. Sci. Nat. III, 3:18. 1845.
Malaxis cochleariaefolia Rich. & Gal. loc. cit.
Microstylis majanthemifolia Reichb. f. in Linnaea 22:834. 1849.
Microstylis cochleariaefolia Reichb. f. loc. cit.
Microstylis ichthyorrhyncha Reichb. f., Beitr. Orch. Centr.-Am. 99. 1866.
Achroanthes maianthemifolia Greene, Pittonia 2:184. 1891.
Microstylis elegantula Schltr. in Fedde Rep. Sp. Nov. 3:17. 1906.

Small, erect, terrestrial herbs from 1 to 4 dm. tall. Stem short, cormous or fleshy, covered with scarious sheaths. Leaves long-petiolate, one to each plant; lamina 2.5–12 cm. long and 2–9.5 cm. broad, ovate-cordate to broadly ovate-cordate, acute or obtuse, membranaceous; petiole elongated, sheathing and enclosing the peduncle for half its length (thus the lamina seemingly borne near the middle of the otherwise naked part of the peduncle). Inflorescence an elongate, many-flowered raceme. Dorsal sepal 2.5–3 mm. long and 1–1.5 mm. broad, elliptic-oval

to elliptic-ovate, obtuse or acutish. Lateral sepals 2.3–2.8 mm. long and about 1.5 mm. broad, oval, obtuse or acute, slightly arcuate, shortly connate at the base. Petals 2–3 mm. long and 0.3–0.7 mm. broad, linear-lanceolate, acute, slightly arcuate. Lip 2–3 mm. long and 1.5–2.5 mm. broad, ovate-cordate or triangular-cordate, acute or obtuse, somewhat concave. Anther bipartite with 2 fused pollinia in each part of it.

Mexico, Guatemala, Honduras, and Panama.

CHIRIQUÍ: Boquete, alt. 1515 m., *Davidson 801*; Casita Alta, Volcán de Chiriquí, alt. 1500–2000 m., *Woodson, Allen & Seibert 830*; Potrero Muleto de Volcán de Chiriquí, alt. 3500–4000 m., *Woodson & Schery 474*.

2. MALAXIS PITTIERI (Schltr.) Ames in Proc. Biol. Soc. Wash. 35:84. 1922.

Microstylis Pittieri Schltr. in Fedde Rep. Sp. Nov. 12:203. 1913.

Erect terrestrial herbs up to about 2 dm. tall. Stems short, fleshy or cormous, unifoliate. Leaves long-petiolate; lamina 2–3 cm. long and about 2–2.5 cm. broad, broadly ovate-cordate, acute or short-acuminate, membranaceous; petiole sheathing the lower half of the peduncle. Inflorescence a sublax, many-flowered raceme up to about 9 cm. long. Dorsal sepal 2.2–2.7 mm. long and about 1 mm. broad, elliptic-oblong, obtuse. Lateral sepals about 2–2.3 mm. long and together about 1.7 mm. broad, suborbicular-ovate, connate ¾ their length. Petals about 2.5 mm. long and 0.5 mm. broad, linear, acute or obtuse. Lip 2.2–2.5 mm. long and 2–2.5 mm. broad, 3-lobed, the disc cochleate and with a carinate U-shaped ridge in front; mid-lobe triangular-lanceolate; lateral lobes oblong-ovate.

Known only from Panama.

CHIRIQUÍ: between Alto de Las Palmas and the top of Cerro de la Horqueta, alt. 2100–2268 m., *Pittier 3277*.

A rare species, distinctive because of the lobing of the lip.

3. MALAXIS SOULEI L. Wms. in Ann. Missouri Bot. Gard. 21:343. 1934.

Microstylis montana Rothr. in Wheeler, Rept. U. S. Geog. Surv. W. 100th Merid. 6(Bot.):264. 1878.
Achroanthes montana Greene, Pittonia 2:183. 1891.
Malaxis montana O. Ktze. Rev. Gen. Pl. 2:673. 1891, non Blume.
Malaxis macrostachya "(La Llave & Lex.) O. Kuntze," sensu Ames & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 3:120. 1935, hardly of La Llave & Lexarza nor of Lindley nor of Kuntze.

Erect terrestrial herbs up to about 4.5 dm. tall. Stems short, fleshy or cormous, probably hypogaeous, covered with the scarious bases of the sheaths and petiole. Leaves 1 on each growth; lamina 2.5–16 cm. long and 1–6 cm. broad, elliptic-ovate to oblong or oblong-ovate to obovate, variable, acute or obtuse, membranaceous; petiole elongated and enclosing the peduncle for a third to a half of its length and thus the lamina borne well above the ground. Inflorescence an elongated, densely flowered spike. Dorsal sepal 1.5–2.5 mm. long and about 0.8–1.2 mm. broad, lanceolate-ovate to elliptic-oblong, acute or obtuse. Lateral sepals 1.5–2.2 mm. long and 0.8–1.2 mm. broad, oblong-elliptic, obtuse. Petals

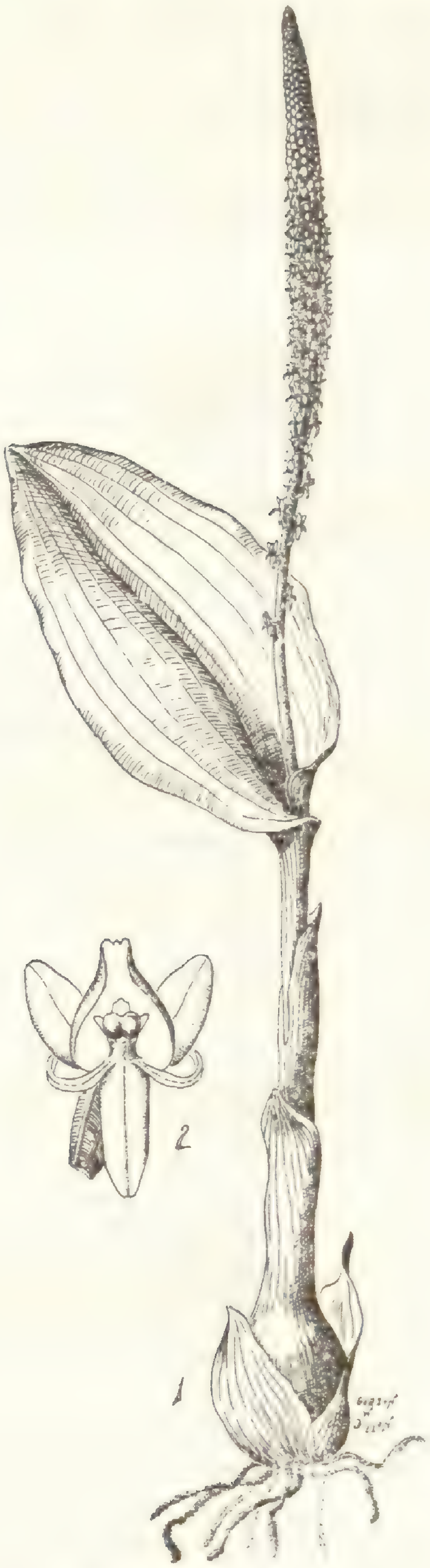


Fig. 117. *Malaxis Soulei*

1.2–2 mm. long and 0.2–0.6 mm. broad, linear or linear-lanceolate, obtuse. Lip 1.7–2.5 mm. long and 1.4–2.5 mm. broad, ovate-cordate to suborbicular-cordate, auriculate, cochleate, apex tridentate.

Arizona, Mexico, Guatemala, Costa Rica, and Panama.

CHIRIQUÍ: Volcán de Chiriquí, alt. about 3025 m., *Davidson 999;* Llanos del Volcán, alt. 1120–1200 m., *Seibert 128;* Casita Alta, Volcán de Chiriquí, alt. about 1500–2000 m., *Woodson, Allen & Seibert 804, 835;* Casita Alta to Cerro Copete, alt. 2300–3300 m., *Woodson & Schery 371.*

4. MALAXIS SIMILLIMA (Reichb. f.) O. Ktze. Rev. Gen. Pl. 2:673. 1891.

Microstylis simillima Reichb. f. Beitr. Orch. Centr.-Am. 101. 1866.

Erect terrestrial herbs up to about 3.5 dm. tall. Stems short, cormous, hypogaeous, bifoliate, covered with the scarious bases of the sheaths and petiole. Leaves long-petiolate; lamina 3.5–14 cm. long and 2–7 cm. broad, lanceolate-ovate to broadly ovate, acuminate, membranaceous, reaching to about the middle of the peduncle. Inflorescence a short, dense, many-flowered, subumbellate raceme. Dorsal sepal 3–4 mm. long and 1.2–1.8 mm. broad, broadly lanceolate or ovate-lanceolate, acute or obtuse. Lateral sepals 3–4 mm. long and 1–1.5 mm. broad, ligulate-lanceolate to elliptic-lanceolate, acute, connate to the middle or less. Petals 2–2.5 mm. long and 0.2–0.5 mm. broad, linear, acute or obtuse. Lip 3.5–4.5 mm. long and 1.5–3 mm. broad, ovate-lanceolate, acute, cochleate, with 2 small lateral or inframarginal teeth below the apex.

Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, alt. 1900 m., *Woodson & Schery 685.*

5. MALAXIS EXCAVATA (Lindl.) O. Ktze. Rev. Gen. Pl. 2:673. 1891; L. Wms. in Bot. Mus. Leafl. Harv. Univ. 6:75. 1938.

Microstylis excavata Lindl. in Bot. Reg. 24:Misc. p. 51. 1838.
Microstylis hastilabia Reichb. f. Beitr. Orch. Centr.-Am. 101. 1866.
Malaxis hastilabia O. Ktze. loc. cit.
Microstylis Carpinterae Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:381. 1918.
Malaxis Carpinterae Ames, Sched. Orch. 7:157. 1922.
Malaxis uncinata Ames & Schweinf. Sched. Orch. 10:15. 1930.

Erect terrestrial herbs from a rhizome, up to about 4.2 dm. tall. Stems short, cormous, bifoliate, covered with the scarious sheaths of the petioles and bracts. Leaves long-petiolate; lamina 5–12 cm. long and 2–7 cm. broad, ovate-lanceolate to ovate, acute or acuminate, membranaceous, paired, reaching to about the middle of the peduncle; petioles sheathing the lower part of the peduncle. Inflorescence a short, dense, many-flowered, subumbellate raceme. Dorsal sepal 3.5–4 mm. long and 1.5–2.7 mm. broad, elliptic-oblong to ovate, obtuse. Lateral sepals 3–4 mm. long and 1.3–2.2 mm. broad, oblong-oval to oblong-ovate, obtuse, free to the base or nearly so. Petals 2.5–3.5 mm. long and 0.3–0.4 mm. broad, linear (or linear-lanceolate), obtuse. Lip 3–4 mm. long and 2.5–4 mm. broad, oblong-cordate to triangular-cordate, auricles at the base erect or uncinate, trilobulate at the apex, disc excavated and gibbous, the cavity with a longitudinal ridge.

Mexico, Costa Rica, Panama, Colombia, Ecuador, Peru, Bolivia, Argentina, and Brazil.

CHIRIQUÍ: Boquete, alt. about 3025 m., *Davidson 1002;* vicinity of Monte Lirio, alt. 1300–1900 m., *Seibert 175;* Casita Alta to Cerro Copete, alt. 2300–3300 m., *Woodson & Schery 368;* Potrero Muleto to summit of Volcán de Chiriquí, alt. 3500–4000 m., *Woodson & Schery 461.*

Description drawn from Central American material. Some South American specimens have smaller flowers. A variable species.

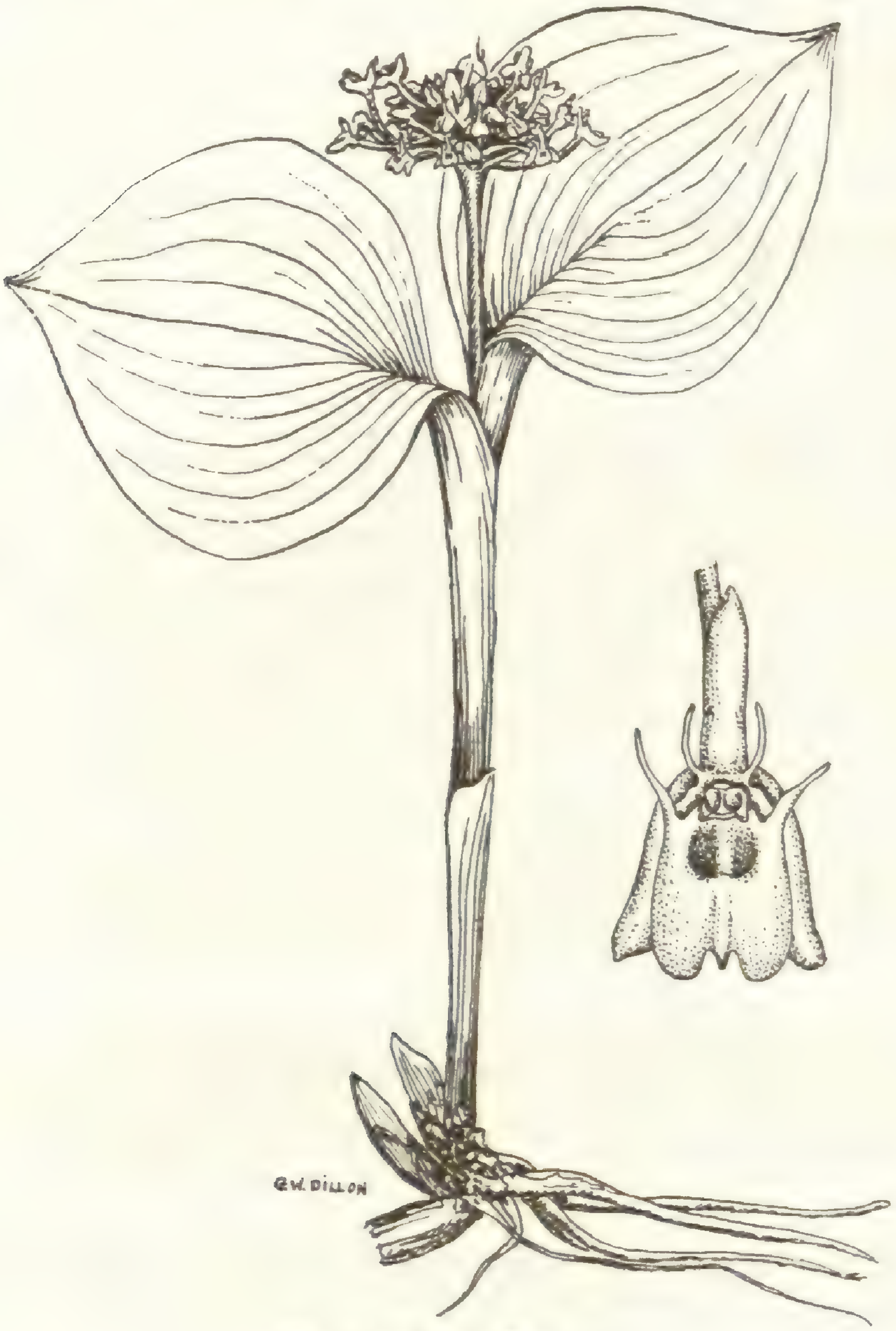


Fig. 118. *Malaxis Woodsonii*

6. MALAXIS WOODSONII L. Wms. in Ann. Missouri Bot. Gard. 26:281, *t. 21, figs. 1-2.* 1939.

Small terrestrial herbs up to about 15 cm. tall. Stems short, cormous, covered with the bases of the petioles and bracts. Leaves long-petiolate; lamina 1.5–5.5 cm. long and 1.3–4.5 cm. broad, broadly ovate, obtuse or acute, crenulate or obscurely serrate, membranaceous, borne about the middle of the peduncle. Inflorescence many-flowered, subumbellate. Sepals 2.5–4 mm. long and 1.5–2.5 mm. broad, broadly lanceolate, obtuse. Petals about 2.5–3 mm. long, filiform. Lip 3.5–5 mm. long and 3–3.5 mm. broad, quadrate in outline; apex 3-lobate, the mid-lobe small and exceeded by the lateral lobes in length, lateral lobes large, rounded, obtuse, the basal auricles linear-lanceolate, acute, erect; disc with two shallow cavities.

Panama.

CHIRIQUÍ: Casita Alta, Volcán de Chiriquí, alt. about 1500–2000 m., *Woodson, Allen & Seibert 831, 832.*

Well distinguished from all other species in Central America by the basal auricles of the lip.

7. MALAXIS FASTIGIATA (Reichb. f.) O. Ktze. Rev. Gen. Pl. 2:673. 1891; Ames & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 3:116. 1935.

Microstylis fastigiata Reichb. f. in Linnaea 22:834. 1849.
Microstylis brachyrrhynchos Reichb. f. in Flora 71:152. 1888.
Malaxis brachyrrhyncha Ames in Proc. Biol. Soc. Wash. 35:84. 1922, sphalm.
Malaxis Lankesteri Ames, Sched. Orch. 4:7. 1923.

Small erect terrestrial herbs up to about 6 dm. tall. Stems short, cormous, bifoliate, tunicate. Leaves long-petiolate; lamina 3–16.5 cm. long and 1.5–9.5 cm. broad, oval to broadly ovate, obtuse or acuminate, membranaceous, paired, reaching to about the middle of the peduncle; petiole sheathing the lower part of the peduncle. Inflorescence a many-flowered, short or rarely somewhat elongated, subumbellate raceme. Dorsal sepal 3–5 mm. long and 1–1.6 mm. broad, lanceolate to ovate-lanceolate, obtuse. Lateral sepals 3–4.5 mm. long and 1–1.8 mm. broad, lanceolate to elliptic-ovate, obtuse, free to their bases. Petals 2–3.5 mm. long and 0.3–0.4 mm. broad, linear or linear-ligulate. Lip 2–4 mm. long and 1.5–2.5 mm. broad, ovate-triangular to ovate-lanceolate, the apex from rounded to subrostrate, acute or obtuse, disc excavated and gibbous, fleshy, the cavity with a longitudinal ridge.

Mexico, Guatemala, Honduras, Costa Rica, and Panama.

CHIRIQUÍ: Llanos del Volcán, alt. 1120–1200 m., *Seibert 327.*

Malaxis fastigiata and M. *brachyrrhyncha* are often considered to be distinct species. The first is supposed to have the lip distinctly rostrate; the second is not supposed to be rostrate (although the type is short-rostrate). This seems to be the only method of separating the two and, as the two conditions intergrade completely, the two species should be considered synonymous.

8. MALAXIS PARTHONII Morr. in Bull. Acad. Roy. Brux. 5:485. 1838; L. Wms. in Ann. Missouri Bot. Gard. 26:281. 1939.

Microstylis histionantha Lk., Kl. & Otto, Ic. Pl. Rar. Hort. Berol. 1:11, *t.* 5. 1841; Hook.

in Bot. Mag. 70: *t. 4103*. 1844.
Microstylis Parthonii Reichb. f. in Walp. Ann. 6:206. 1861.
Microstylis Brenesii Schltr. in Fedde Rep. Sp. Nov. Beih. 19:167. 1923.

Erect terrestrial herbs up to about 6 dm. tall. Stems short, cormous, bifoliate, covered with the scarious bases of the petioles and bracts. Leaves 8–18 cm. long and 3–12 cm. broad, ovate-lanceolate to broadly ovate or suborbicular, acute or acuminate, membranaceous, paired, reaching to about the middle of the scape, their petioles sheathing the lower part of the peduncle. Inflorescence a short, many-flowered, subumbellate raceme. Dorsal sepal 4.5–6 mm. long and 1.5–2.5 mm. broad, lanceolate-ligulate to elliptic, obtuse. Lateral sepals 3–5 mm. long and together up to 6 mm. broad, connate to the middle or beyond or free to the base, suborbicular in outline or separately lanceolate-ovate, obtuse. Petals 2–4 mm. long, filiform. Lip 3.5–5 mm. long and 3.5–7 mm. broad, orbicular to transversely oblong-oval, concave toward the base.

Mexico, Salvador, Costa Rica, Panama; reported from Peru but a small-flowered form if so.

CANAL ZONE: vicinity of Salamanca Hydrographic Station, alt. about 80 m., *Woodson, Allen & Seibert 1581*. CHIRIQUÍ: Finca Lérida to Boquete, alt. 1300–1700 m., *Woodson, Allen & Seibert 1172*.

8a. MALAXIS PARTHONII Morr. var. DENTICULATA (Reichb. f.) Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 3:40. 1934.

Microstylis Parthonii Reichb. f. var. *denticulata* Reichb. f., Beitr. Orch. Centr.-Am. 100. 1866.
Microstylis Wercklei Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:382. 1918.
Malaxis Wercklei Ames in Proc. Biol. Soc. Wash. 35:85. 1922.

Much like the species except the floral parts smaller, the lip denticulate or ciliate and the cavity at the base of the lip definitely bipartite.

Costa Rica and Panama.

CHIRIQUÍ: vicinity of upper Río Chiriquí, Monte Lirio, alt. 1300–1900 m., *Seibert 170, 221*; valley of upper Río Chiriquí, alt. 1300–1900 m., *White & White 17*; vicinity of Casita Alta, alt. 1500–2000 m., *Woodson, Allen & Seibert 832bis*.

9. MALAXIS BLEPHARIGLOTTIS (Schltr.) Ames in Proc. Biol. Soc. Wash. 35:84. 1922.

Microstylis blephariglottis Schltr. in Fedde Rep. Sp. Nov. 12:202. 1913.

Small, erect, epiphytic (or terrestrial?) herbs up to about 4.5 ~~dm.~~ tall. Stems up to about 2 cm. long, densely leaved. Leaves 4.5–12 cm. long and 0.8–1.5 cm. broad, elliptic to oblanceolate-ligulate, acute or acuminate, membranaceous. Inflorescence densely flowered, elongated; bracts up to about 8 mm. long, lanceolate, acuminate, entire or lacerate, cucullate. Sepals 2.5–3 mm. long and 1–1.5 mm. broad, elliptic-lanceolate to elliptic-oblong, obtuse, slightly cucullate. Petals 3–3.5 mm. long and 0.4–0.6 mm. broad, linear-ligulate, obtuse. Lip 3–4 mm. long and 2–3 mm. broad, oblong-obovate, obtuse or acute, slightly constricted above the base, the base emarginate and callus thickened, margins ciliate or ciliate-lacerate.

Costa Rica and Panama.

CHIRIQUÍ: above El Boquete, alt. 1650–1925 m., *Maxon 5667*.

Known in Panama only from the original specimen although the locality has been often collected. This species, along with *Malaxis tipuloides* (Lindl.) O. Ktze., belongs to Schlechter's section BLEPHARIGLOTTIS of *Microstylis* (Schlechter, loc. cit. 203). The species of the section (perhaps a dozen) resemble some species of *Liparis* rather closely. The anthers are neither completely erect, as they are supposed to be in *Malaxis*, nor are they incumbent as in *Liparis*. The position of the anther in these genera is controlled by the length of the rostellum, and this species has a relatively long one. It is perhaps important that the pollinia of these two species have their long axis parallel to the long axis of the column, which doubtless indicates an anther nearly erect. The position of the anther has been used in separation because there is hardly a way in which the two genera may be distinguished. Perhaps the relative length of the column would afford a better criterion.

10. MALAXIS TIPULOIDES (Lindl.) O. Ktze. Rev. Gen. Pl. 2:673. 1891, as *Malaxis tipulodea*.

Microstylis tipuloides Lindl. in Ann. & Mag. Nat. Hist. 15:256. 1845.
Liparis eustachys Schltr. in Fedde Rep. Sp. Nov. Beih. 19:91. 1923.
Liparis fratrum Schltr. loc. cit. 92; L. Wms. in Ann. Missouri Bot. Gard. 27:282. 1940.
Liparis tipuloides Schltr. loc. cit. 91; C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 6:2. 1938.

Repent or ascending terrestrial herbs often with the stems rooting at the nodes, up to about 7 dm. long. Stems up to about 10 cm. long, densely leaved, slender. Leaves 5–17 cm. long and 0.9–3.5 cm. broad, elliptic to elliptic-oblanceolate, petiolate, acute, membranaceous. Inflorescence a loose or dense raceme up to about 5–6 dm. long, much exceeding the stems and the leaves. Dorsal sepal 5.5–6 mm. long and 1–2 mm. broad, ligulate, lanceolate, obtuse. Lateral sepals similar to the dorsal but somewhat arcuate. Petals 4.5–7 mm. long, linear or linear-lanceolate, obtuse or acute. Lip 5.5–9.5 mm. long and 3–4.5 mm. broad, elliptic-obovate, acuminate, auriculate, ciliolate, somewhat constricted below the middle.

Costa Rica, Panama, and Colombia.

CHIRIQUÍ: Cerro Punta, alt. 2000 m., *Allen 1528*.

See note on preceding species.

11. MALAXIS **Wendlandii** (Reichb. f.) L. Wms., comb. nov.

Liparis Wendlandii Reichb. f. Beitr. Orch. Centr.-Am. 98. 1866.

Small, caespitose, epiphytic herbs up to about 6 dm. tall. Stem a short cormous pseudobulb covered with fibrous sheaths and the bases of the petioles and bracts. Leaf 1, petiolate; lamina 0.9–2 cm. long and 0.5–1.2 cm. broad, oval to suborbicular, acute, membranaceous. Inflorescence a few-flowered raceme, the base enfolded by the petiole and the bracts. Dorsal sepal about 3–3.5 mm. long and 1.5–1.7 mm. broad, ovate-lanceolate, obtuse or acutish. Lateral sepals 2.7–3.2

mm. long and about 0.8–1.2 mm. broad, lanceolate to ovate-lanceolate, obtuse or acutish, somewhat arcuate. Petals about 3 mm. long and 0.6–0.7 mm. broad, linear-lanceolate, acute or acuminate. Lip 3–3.5 mm. long and 2–2.6 mm. broad, obovate-triangular, retuse, denticulate, with an umbonate callus toward the base. Column about 0.75 mm. long, at right angles to the lip; anther about 0.75 mm. long, erect or semi-erect, long-rostrate, the rostrum about 0.5 mm. of the length of the anther; rostellum very long.

Costa Rica and Panama.

CHIRIQUÍ: valley of the upper Río Chiriquí Viejo, vicinity of Monte Lirio, alt. 1300–1900 m., *Seibert 195, 216.*

Malaxis Wendlandii is a very curious plant which seems to have most of the technical characters of *Malaxis* but a lip like that of *Liparis*, in which genus it was originally placed. The short column, erect or semi-erect anther with separated cells and the long rostellum point to *Malaxis*. The rostrate anther is unusual. The shape of the lip certainly reminds one of the genus *Liparis*.

25. LIPARIS L. C. Rich.

LIPARIS L. C. Rich. in Mém. Mus. Par. 4:52, *t. 5, fig. 10.* 1818; Lindl. Gen & Sp. Orch. Pl. 26. 1830; Benth. & Hook. Gen. Pl. 2:495. 1883; Ridley in Jour. Linn. Soc. 22:252-297. 1886.

Small terrestrial or epiphytic herbs with pseudobulbous stems. Leaves few (1–4), petiolate, the base of the petiole enclosing the pseudobulb; lamina membranaceous (in Panama), usually broad. Inflorescence a few- to several-flowered, terminal raceme. Flowers small. Sepals free, subequal, spreading. Petals subequal to the sepals or usually smaller and narrower. Lip erect or spreading, shortly adnate to the base of the column or free, sessile or usually shortly clawed, entire or usually emarginate, 1- to 2-tuberculate at the base, broader than the sepals. Column elongated (compared to that of *Malaxis*), arcuate, semi-terete, footless, usually parallel to the axis of the lip; anther terminal, operculate, incumbent, usually soon deciduous and versatile; pollinia 4, waxy, their long axis at right angles to the long axis of the column or nearly so.

About 200 species in tropical and temperate regions with the greatest concentration in tropical Asia and Oceania. Closely allied to *Malaxis*.

1. LIPARIS ELATA Lindl. in Bot. Reg. 14: *t. 1175.* 1828; L. Wms. in Ann. Missouri Bot. Gard. 26:282. 1939.

Terrestrial herbs from 13 to 40 cm. tall. Stems short, becoming fleshy or cormous, sheathed with the bases of the petiole. Leaves petiolate, usually 3 or 4 from each stem, rosulate; lamina 5–30 cm. long and 2.5–11 cm. broad, elliptic-oval to ovate, acute or acuminate, membranaceous. Inflorescence a more or less lax, few- to many-flowered raceme. Dorsal sepal 6–7 mm. long and 2–2.2 mm. broad, oblong-lanceolate, obtuse. Lateral sepals 4–6 mm. long and 2–3 mm. broad, oval to ovate, obtuse, arcuate. Petals 5–5.7 mm. long and 1–1.5 mm.

Fig. 119. *Liparis elata*

broad, linear to linear-oblanceolate, obtuse, arcuate. Lip 4–5.5 mm. long and 4–5 mm. broad, obovate to flabellate, truncate or emarginate, fleshy, bituberculate at the base. Column long, arcuate.

Florida, Mexico, Guatemala, Honduras, Costa Rica, Panama, the West Indies, Brazil, Colombia, and Peru.

CANAL ZONE: Quebrada Salamanca, alt. 70 m., *Dodge, Steyermark & Allen 16988;* Salamanca Hydrographic Station, Río Pequeñí, alt. about 80 m., *Woodson, Allen & Seibert 1580.* PANAMÁ: Cerro Campana, alt. 600–800 m., *Allen 2677;* foothills east of city, *Powell 243.*

A widespread and somewhat variable species.

26. HEXISEA Lindl.

HEXISEA Lindl. in Hook. Jour. Bot. 1:7. 1834.

Euthonaea Reichb. f. in Bot. Zeit. 10:772. 1852.

Caespitose epiphytic herbs. Stems simple or branched, terete or angled, segmented, thickened or pseudobulbous. Leaves few, usually one or two from the apex of each segment, usually deciduous annually. Inflorescence from the apex of the growths, few-flowered, short; flowers small but highly colored. Sepals similar, erect or spreading, narrow, the laterals often shortly connate at the base. Petals similar to the sepals. Lip simple or lobulate, adnate at the base with the column, base of the lamina geniculate and usually callus-thickened. Column short, adnate to the lip below the middle; clinandrium 3-lobed; anther operculate, incumbent; pollinia 4, collateral, waxy.

About a half dozen species in Central and South America. Living material should prove instructive as to the origin of the inflorescence and new growth, for both apparently come from the apex of the preceding growth, which is somewhat unusual. The monotypic genus *Alemania* Llave & Lex. (The only one of the Llave & Lexarza orchids for which a type is known to exist) should possibly include *Hexisea.* Florally they are not to be distinguished but the vegetative growth may keep them separate until more is known about them.

1. HEXISEA BIDENTATA Lindl. in Hook., Jour. Bot. 1:8. 1834.

Diothonaea imbricata Lindl. Sert. Orch. *t. 40, f. 1.* 1841.
Epidendrum oppositifolium Rich. & Gal. in Ann. Sci. Nat. III, 3:21. 1845.
Diothonaea oppositifolia Reichb. f. in Linnaea 22:842. 1849.
Euthonaea oppositifolia Reichb. f. in Bot. Zeit. 10:772. 1852.
Euthonaea imbricata Reichb. f. loc. cit.
Hexisea oppositifolia Reichb. f. in Walp. Ann. 6:470. 1862.
Hexisea imbricata Reichb. f. loc. cit.

Caespitose epiphytic herbs up to about 4 dm. tall. Stems segmented, the terminal growth producing flowers and then a new growth and leaves from its apex, simple or branched, the segments subcylindric or fusiform. Leaves 2.5–16 cm. long and 0.3–1 cm. broad, linear to linear-ligulate, obtuse or retuse, coriaceous, borne from the apex of the segment of the stem. Inflorescence a short,

few-flowered raceme. Flowers usually bright red. Sepals 10–14 mm. long and 2.5–4 mm. broad, lanceolate or elliptic-lanceolate, acute, the laterals somewhat oblique. Petals 10–13 mm. long and 2–3 mm. broad, linear-lanceolate to linear-oblong, acute. Lip 8–13 mm. long and 2.5–4 mm. broad, oblong-oblanceolate, obtuse or acute, base of the lamina geniculate and the angle or "knee" usually callus-thickened, claw adnate with the basal half of the column.

Mexico, Honduras, Nicaragua, Costa Rica, Panama, Colombia, and British Guiana.

CHIRIQUÍ: "Chiriquí," alt. 1200 m., *Powell 64, 3113, 3156, 3157, 3161, 3190, 3192, 3214, 3504.* PANAMÁ: San Juan Hills, east of Panama City, *Powell 333, 3146, 3420;* "Panama": Panama et Colombia occidentalis, in 1831, *Cuming 1297.* VERAGUAS: headwaters of the Río Cañazas, alt. 300–600 m., *Allen 195;* Bahia Honda, *Taylor 1509.*

The genus should possibly be referred to *Alemania* Llave & Lex.

(To be concluded in Part III, Fasc. 3)

FLORA OF PANAMA

Part III. Fascicle 3

ORCHIDACEAE

By LOUIS O. WILLIAMS

27. EPIDENDRUM L.

EPIDENDRUM L. Sp. Pl. ed. 2. 1347. 1763; Ames, Hubbard & Schweinfurth, Genus Epidendrum in U. S. & Middle America, pp. 1–233. 1936. Non L. Sp. Pl. ed 1. 952. 1753.—Conserved name, the generic type being *Epidendrum nocturnum* Jacq.

Amphiglottis Salisb. in Trans. Hort. Soc. Lond.1:294. 1812, nomen nudum.
Auliza Salisb. loc. cit., nomen nudum.
Dinema Lindl. Collect. Bot., App. 1825, nomen subnudum.
Encyclia Hook. in Bot. Mag. 55: *t. 2831*. 1828.
Nanodes Lindl. in Bot. Reg. 18: *t. 1541*. 1832.
Physinga Lindl. in Bot. Reg. 24: Misc. p. 32. 1838.
Barkeria Knowl. & Westc. Fl. Cab. 2:7, *t. 49*. 1838.
Hormidium Lindl. ex Heynhold, Nomencl. Bot. Hort. Nachtr. 880. 1841.
Spathiger Small, Fl. Miami, p. 55. 1913.
Dimerandra Schltr. in Fedde Rep. Sp. Nov. Beih. 17:43. 1922.

Small to large, epiphytic or semi-epiphytic herbs or subshrubs with or without the stems swollen into pseudobulbs. Stems (secondary) swollen into pseudobulbs and the leaves borne at or near the apex of the pseudobulbs (§ ENCYCLIUM); or the stems slender and not swollen and with the leaves scattered along the stem (§ EUEPIDENDRUM); or slender or fusiform stems with the leaves scattered along them but with the base of the stems swollen (§ BARKERIA). Leaves variable in shape and size, usually coriaceous but occasionally fleshy. Inflorescence commonly terminal but occasionally lateral or both terminal and lateral, rarely borne from lateral, leafless shoots which later develop into pseudobulbs or stems; from simple and often 1-flowered to compound and many-flowered. Flowers from small to relatively large. Sepals equal or subequal, spreading, reflexed or subconnivent. Petals similar to the sepals but usually smaller and narrower or even filiform, occasionally broader. Lip unguiculate; the claw free, partially free, or adnate to the column; lamina simple or 3-lobed, the lobes often lobulate; the disc ecallous or usually bicallous and with or without lamellae or additional calluses. Column stout or slender, alate or exalate, clinandrium variously developed. Anther terminal, operculate, incumbent, 2-celled and with each cell more or less divided by a septum; pollinia 4, uniseriate, laterally compressed, with appendages, rarely without, waxy. Capsule various, winged or wingless.

Issued December 7, 1946.

Epidendrum is the largest genus of neotropical orchids. It contains about one thousand species. Certain species are exceedingly abundant in their range and in places might almost be called weeds.

The most recent study of this vast genus is Ames, Hubbard, and Schweinfurth's admirable monograph, cited above. We are much indebted to the authors of the fine key in that work, which has been followed as closely as possible in the following key to the Panamanian species. We are particularly indebted to Mr. Charles Schweinfurth for suggestions and criticism during its preparation, and to Prof. Oakes Ames for his generous permission to use many of the illustrations.

a. Stems with true pseudobulbs surrounded by scarious non-leaf-bearing sheaths or occasionally leaf-bearing sheaths; leaves 1 or more borne at or near the summit of the pseudobulbs; lip free from the column or variously adnate to it.....Sect. I. Encyclium (p. 322)
aa. Stems lacking true pseudobulbs although sometimes thickened; leaves distributed along the stem or at least leaf-sheaths surrounding the thickened bases of the stem.
b. Lip free from the column or adnate only at the base; the column usually winged; the stems swollen at the base or fusiform-cylindric .....Sect. II. Barkeria (p. 338)
bb. Lip usually adnate to the entire length of the column (occasionally less); the column not winged laterally; stem never swollen....Sect. III. Euepidendrum (p. 338)

Sect. I. Encyclium

a. Lip entire or at most obscurely lobulate.
b. Pseudobulbs 1-leaved.
c. Lip ligulate or pandurate, slightly broader toward the apex.
d. Ovary muricate; sepals more than 10 mm. long..... 3. E. Boothii
dd. Ovary smooth; sepals less than 10 mm. long..... 13. E. Ottonis
cc. Lip ovate to suborbicular-cordate.
d. Leaves narrowly linear.....20. E. Stangeanum
dd. Leaves ligulate to oblong-elliptic.
e. Lip hastate-rotund, acute; sepals oblong-lanceolate.....18. E. spondiadum
ee. Lip ovate to ovate-subrotund, acuminate; sepals linear-lanceolate.....10. E. fragrans
bb. Pseudobulbs 2- or more leaved.
c. Inflorescence abbreviated; peduncle short or wanting..... 1. E. abbreviatum
cc. Inflorescence not abbreviated; peduncle more or less elongated.
d. Lamina of the lip noticeably longer than broad.
e. Apex of the lip rounded, obtuse, truncate or retuse [Species reported in cultivation]..... 80. E. lividum
ee. Apex of the lip acute or acuminate..... 4. E. brassavolae
dd. Lamina of the lip as broad as long or broader than long.
e. Bracts of the inflorescence conduplicate and clasping the pedicel, conspicuous; rachis flexuose; pseudobulb stipitate.....22. E. volutum
ee. Bracts of the inflorescence concave to flat; rachis straight or inconspicuously flexuose.
f. Callus of the lip a simple or bilobed cushion.
g. Disc of the lip occupied by a central bilobed cushion-like callus; sepals and petals usually maculate..... 9. E. crassilabium
gg. Disc of the lip with a simple, basal, velutinous cushion-like callus; sepals and petals not maculate.....11. E. ionophlebium
ff. Callus of the lip consisting of 2 or 3 basal keels or swellings..... 7. E. cochleatum
aa. Lip 3-lobed or 3-lobulate.
b. Column with a distinct lateral auricle on each side about opposite the stigma.
c. Column more or less sharply recurved in the middle; veins of the mid-lobe of the lip smooth or nearly so.....12. E. oncidioides var. ramonense

cc. Column straight or nearly so; veins on the mid-lobe of lip often verruculose.
d. Lateral lobes of the lip triangular-lanceolate to oblong.....12a. E. ONCIDIOIDES var. GRAVIDUM
dd. Lateral lobes of the lip spatulate or oblong-spatulate.....12b. E. ONCIDIOIDES var. MOOREANUM
bb. Column lacking distinct lateral auricles on either side of the stigma.
c. Mid-lobe of lip proportionally narrower at base, linear-elongate or linear-filiform.
d. Lateral lobes of lip fimbriate-ciliate..... 6. E. CILIARE
dd. Lateral lobes of lip entire to somewhat dentate.....14. E. PARKINSONIANUM
cc. Mid-lobe of lip proportionally broader at base, not linear-elongate or linear-filiform.
d. Outer margins of mid-lobe of lip dentate to fimbriate.....19. E. STAMFORDIANUM
dd. Outer margins of mid-lobe of lip not dentate to fimbriate.
e. Mid-lobe of the lip smaller than either lateral lobe or about equal to either of them.
f. Floral bracts conspicuous, 14 mm. long or more.
g. Lip 3-lobate; mid-lobe about as broad as long.....22. E. VOLUTUM
gg. Lip deeply 3-partite; mid-lobe oblanceolate, longer than broad..... 6a. E. CILIARE var. OERSTEDII
ff. Floral bracts not very conspicuous, 10 mm. or less long.
g. Mid-lobe of the lip triangular.....16. E. PYGMAEUM
gg. Mid-lobe of the lip not triangular.
h. Petals less than one-half as broad as the lateral sepals; inflorescence commonly basal.....17. E. ROUSSEAUAE
hh. Petals at most only slightly narrower than the sepals; inflorescence terminal..... 9. E. CRASSILABIUM
ee. Mid-lobe of the lip considerably larger than each lateral lobe.
f. Pseudobulbs 1-leaved.
g. Base of the lip gradually narrowed below the lateral lobes; floral bracts large, chartaceous..... 5. E. CAMPYLOSTALIX
gg. Base of the lip abruptly contracted below the lateral lobes; floral bracts small.....12a. E. ONCIDIOIDES var. GRAVIDUM
ff. Pseudobulbs 2- or more leaved.
g. Pseudobulb contracted into a caulescent neck, 4–10 cm. long, separating the leaves from the swollen portion..... 21. E. VARICOSUM
gg. Pseudobulb not contracted into a caulescent neck, leaves almost sessile on the swollen portion.
h. Mid-lobe of lip trulliform, acuminate..... 15. E. PRISMATOCARPUM
hh. Mid-lobe of lip not trulliform nor acuminate.
i. Middle clinandrial tooth at summit of column broad, erect, fleshy and quadrate or orbicular-quadrate, distinct from lateral teeth..... 8. E. CONDYLOCHILUM
ii. Middle clinandrial tooth at summit of column small, deltoid, incurved, obtuse or acute, separated from lateral teeth by a shallow sinus.
j. Area of mid-lobe of lip about 4–10 times that of either lateral lobe, usually retuse or bilobed.
k. Margin of mid-lobe of lip entire to erose-crenulate..... 2. E. ATROPURPUREUM
kk. Margin of mid-lobe of lip dentate-lacerate..... 2a. E. ATROPURPUREUM var. LACINIATUM
jj. Area of mid-lobe of lip about 3 times that of either lateral lobe, or less.
k. Column somewhat sharply recurved in the middle; veins of mid-lobe usually smooth..... 12a. E. ONCIDIOIDES var. RAMONENSE
kk. Column nearly straight; veins of mid-lobe of lip often verruculose.
l. Lateral lobes of lip spatulate to oblong..... 12b. E. ONCIDIOIDES var. MOOREANUM
ll. Lateral lobes of lip deltoid-lanceolate to oblong..... 12a. E. ONCIDIOIDES var. GRAVIDUM

Sect. II. Barkeria

One species in Panama.....23. E. stenopetalum

Sect. III. Euepidendrum

a. Leaves equitant.
  b. Flowers long-pedunculate and terminal.....43. E. equitantifolium
  bb. Flowers sessile or nearly so and axillary.....50. E. lockhartioides
aa. Leaves not equitant.
 b. Lip distinctly 3-lobed or 3-lobulate.
  c. Leaves terete, or subterete and sulcate, or flat and ligulate-linear.
   d. Mid-lobe of lip semicircular-triangular, apiculate.....65. E. pudicum
   dd. Mid-lobe of lip elliptic to narrowly oblong, provided with a prominent lamellate callus.....75. E. teretifolium
  cc. Leaves flat and usually more than 3 mm. broad.
   d. Column with a distinct dorsal horn at the apex.....51. E. microdendron
   dd. Column without a distinct dorsal horn at the apex.
    e. Mid-lobe of lip narrowly triangular to linear, several times longer than broad.
     f. Lateral lobes of the lip laciniate-fimbriate.....35. E. criniferum
     ff. Lateral lobes of the lip not laciniate-fimbriate.
      g. Inflorescence subtended by one or more large spathes.....54. E. obesum
      gg. Inflorescence usually not subtended by spathes; if so then by small inconspicuous ones.....53. E. nocturnum
    ee. Mid-lobe of the lip not narrowly triangular to linear.
     f. Lip tubular-involute, usually fleshy, in outline triangular to ovate-triangular, longer than broad.....72. E. sculptum
     ff. Lip not tubular-involute, usually flat.
      g. Area of the mid-lobe of lip approximately twice that of either lateral lobe or even larger.
       h. Outer surface of lateral sepals verrucose.....44. E. exasperatum
       hh. Outer surface of the lateral sepals smooth.
        i. Apex of mid-lobe of lip rounded or protuberant-acute.
         j. Floral bracts large, cucullate, only slightly shorter than the flowers; inflorescence subcapitate with 1 flower appearing at a time.....41. E. ellipsophyllum
         jj. Floral bracts small (or if large then much shorter than the flowers), not cucullate; inflorescence not subcapitate and normally with several flowers at a time.
          k. Lateral lobes of the lip dentate to lacerate; inflorescence usually long-pedunculate.....47. E. imatophyllum
          kk. Lateral lobes of the lip not dentate nor lacerate; inflorescence not long-pedunculate.
           l. Lip spatulate, base of the mid-lobe broad and not unguiculate.....79. E. Warscewiczii
           ll. Lip not spatulate, base of the mid-lobe with a narrowed or unguiculate base.....38. E. dentilobum
        ii. Apex of the mid-lobe of the lip truncate, retuse or bilobed, sometimes apiculate.
         j. Lateral lobes of lip digitate, lacerate or deeply dentate; sepals pink, not maculate.....27. E. caligarium
         jj. Lateral lobes of the lip entire to minutely crenulate or crenate-dentate or bilobulate.
          k. Leaves obtuse and minutely bilobed at the apex, usually ovate to elliptic or elliptic-lanceolate.
           l. Inflorescence paniculate; sepals and petals maculate.....71. E. Schumannianum
           ll. Inflorescence racemose; sepals and petals not maculate.....42. E. Endresii
          kk. Leaves acute or acuminate, not bilobed at the apex, usually linear-lanceolate to lanceolate.
           l. Lobules of the mid-lobe of lip several times larger than the dentiform lateral lobes; inflorescence usually subumbellate or subcorymbose.....29. E. centradenia

ll. Lobules of the mid-lobe of the lip about equalling in size the oblong or falcate-lanceolate lateral lobes, or smaller; inflorescence usually racemose..... 30. E. CENTROPETALUM

gg. Area of mid-lobe of lip about equal to that of either lateral lobe or less.

h. Ovary with a saccate vesicle at the summit..... 58. E. PHYSODES

hh. Ovary without a saccate vesicle at the summit.

i. Column, when seen from the side, like an ox-bow... 39. E. DIFFORME

ii. Column, when seen from the side, not like an ox-bow, at most somewhat arched.

j. Inflorescence 1-flowered or subumbellate.

k. Sepals narrowly lanceolate, long-acuminate; stems usually straight or nearly so; usually but 1 flower open at a time..... 40. E. EBURNEUM

kk. Sepals broadly lanceolate to oblanceolate or obovate-oblong; stems flexuose.

l. Sepals more than 1 cm. broad; inflorescence, as far as known, 1-flowered..... 57. E. PENDENS

ll. Sepals less than 0.8 cm. broad; inflorescence usually more than 1-flowered.

m. Mid-lobe of lip, when present, twice or more broader than long, semi-elliptic to reniform..... 39. E. DIFFORME

mm. Mid-lobe of lip usually little broader than long; if as broad, subquadrate to subquadrate-ovate.

n. Apex of the mid-lobe truncate, retuse or somewhat bilobed, usually apiculate..... 39a. E. DIFFORME var. FIRMUM

nn. Apex of the mid-lobe of the lip triangular, acute..... 39b. E. DIFFORME var. SIMULACRUM

jj. Inflorescence racemose or paniculate.

k. Mid-lobe of the lip not bilobed nor retuse.

l. Inflorescence a dense spike-like raceme which is more or less arcuate; leaves linear-lanceolate..... 62. E. POWELLII

ll. Inflorescence not a dense spike-like raceme; leaves elliptic to lanceolate or oblanceolate.

m. Summit of column with a denticulate, sometimes 4-lobed wing..... 40. E. EBURNEUM

mm. Summit of the column wingless.

n. Lip up to about 8.5 mm. broad; stems simple..... 25. E. ANCEPS

nn. Lip 12 mm. or more broad; stems branched..... 48. E. INCOMPTUM

kk. Mid-lobe of the lip bilobed or retuse.

l. Margins of lateral lobes of lips digitate, lacerate, or dentate.

m. Peduncle elongated, with close scarious tubular sheaths and with the flowers in dense racemes or sometimes paniculate; stems usually rooting opposite the leaves.. 46. E. IBAGUENSE

mm. Peduncles not much elongated or if so the sheaths spreading, foliaceous or imbricated; stems not bearing roots opposite the leaves.

n. Mid-lobe of the lip with two strongly explanate lobules..... 56. E. PANICULATUM

nn. Mid-lobe of the lip with the lobules more or less porrect, never strongly explanate.

o. Lateral sepals 7–16 mm. long..... 60. E. POLYANTHUM

oo. Lateral sepals 4–6.5 mm. long..... 60a. E. POLYANTHUM var. MYODES

ll. Margins of lateral lobes of lip not digitate, lacerate, nor dentate, sometimes crenate, undulate, or asymmetrically bilobed.
m. Spread between the tips of the divaricate lobules of the mid-lobe of the lip about twice or more greater than the length of the lobes..... 74. E. SUBNUTANS
mm. Spread between the tips of the more or less porrect lobules of the mid-lobe of lip or breadth of the mid-lobe less than twice the length.
n. Lip 2 cm. or more broad; raceme usually elongated and more than 6 cm. in diameter..... 52. E. MOYOBAMBAE
nn. Lip 1.5 cm. or less broad.
o. Pair of basal calluses of the lip absent; peduncle usually elongated..... 25. E. ANCEPS
oo. Pair of basal calluses of the lip present.
p. Peduncle conspicuously winged and ancipitous..... 24. E. ALLENII
pp. Peduncle not winged and ancipitous.
q. Lateral sepals 6.5–16 mm. long.... 60. E. POLYANTHUM
qq. Lateral sepals 4–6.5 mm. long.... 60a. E. POLYANTHUM var. MYODES

bb. Lip simple, obscurely lobate or bilobed.
c. Lower portion of lateral margins of lip irregularly lacerate to coarsely dentate; lamina with a prominent central keel extending almost to the apex..... 47. E. IMATOPHYLLUM
cc. Lower portion of lateral margins of lip neither lacerate nor coarsely dentate.
d. Leaf-blade not articulated to the sheath, thus not deciduous.
e. Plants elongated and creeping; lateral sepals without a keel on the outer surface..... 32. E. CONFERTUM
ee. Plants not elongated and creeping; lateral sepals keeled on the outer surface.
f. Lip cordate-ovate, acute; clinandrium entire or denticulate..... 33. E. CONGESTUM
ff. Lip reniform-suborbicular, apiculate; clinandrium lacerate..... 70. E. SCHLECHTERIANUM
dd. Leaf-blade articulated to the sheath, thus deciduous.
e. Ovary with a more or less semiglobose vesicle at the summit just under the lip.
f. Anterior portion of the lamina of lip broadly rounded.
g. Leaves triangular-lanceolate or narrower, scattered along the stem; lip not strongly conduplicate..... 58. E. PHYSODES
gg. Leaves elliptic to elliptic-oblong, congested on the upper part of the stem; lip strongly conduplicate..... 28. E. CAROLII
ff. Anterior portion of the lamina of the lip acute or acuminate..... 73. E. STROBILIFERUM
ee. Ovary without a semiglobose vesicle at the summit.
f. Back of the column terminating in a distinct, more or less spreading horn..... 51. E. MICRODENDRON
ff. Back of the column not terminating in a distinct spreading horn.
g. Lip with a tridentate (not tricarinate) or V-shaped callus at or near the base of the lamina.
h. Leaves usually sulcate, terete or subterete, if flattened then very narrowly linear-lanceolate, often grass-like and acuminate..... 49. E. ISOMERUM
hh. Leaves flat or at most conduplicate, ligulate or linear-oblong to lorate, or lanceolate to nearly elliptic, obtuse, bilobate.
i. Lamina of the lip suborbicular-cordate, commonly broader than long..... 59. E. PLATYSTIGMA

ii. Lamina of the lip triangular to ovate-triangular, usually longer than broad.
j. Margins of the lip very fleshy and thickened..... 69. E. SANCHOII
jj. Margins of the lip not fleshy and thickened.
k. Stems slender, usually 4 mm. or less in diameter below the inflorescence; leaf-sheaths and bracts not maculate; inflorescence usually lax and narrow..... 66. E. RAMOSUM
kk. Stems thicker, usually 5–6 mm. in diameter just below the inflorescence; leaf-sheaths and bracts usually finely maculate; inflorescence typically rather congested and broad..... 66a. E. RAMOSUM var. ANGUSTIFOLIUM

gg. Lip never with a tridentate or V-shaped callus at or near the base of the lamina.
h. Lamina of the lip triangular with a truncate base; inflorescence 1-flowered..... 78. E. TRIANGULABIUM
hh. Lamina of the lip never triangular with a truncate base.
i. Entire length of column adnate to base of lateral sepals..... 61. E. PORPAX
ii. Entire length of column not adnate to the base of the lateral sepals.
j. Stems branched.
k. Lip callus-bearing.
l. Clinandrium lacerate-dentate; lateral sepals falcate and acuminate; plant dwarf..... 37. E. DENTIFERUM
ll. Clinandrium not lacerate-dentate; lateral sepals not falcate.
m. Floral bracts very conspicuous, large and broad..... 31. E. COCLÉENSE
mm. Floral bracts not conspicuous, small and usually narrow.
n. Disc of lip bearing more or less lobate or retuse calluses, usually situated well above the base..... 77. E. TRACHYTHECE
nn. Disc of the lip not bearing more or less lobate or retuse calluses.
o. Clinandrium with 4 subrectangular petaloid lobes, the central pair longest and narrowest..... 76. E. TETRACEROS
oo. Clinandrium lacking 4 lobes..... 26. E. BISULCATUM
kk. Lip ecallose (mid-nerve sometimes thickened).
l. Inflorescence 1-flowered..... 67. E. REPENS
ll. Inflorescence 2- or more flowered.
m. Leaves less than 1 cm. broad, linear to linear-oblong..... 69. E. SANCHOII
mm. Leaves more than 1 cm. broad, elliptic to elliptic-ovate..... 36. E. CRYPTANTHUM
jj. Stems unbranched.
k. Floral bracts conspicuous due to their size compared to the flower, or to their distinct spreading character.
l. Lamina of the lip broader than long, reniform, bilobed or retuse..... 34. E. CORIIFOLIUM
ll. Lamina of the lip longer than broad or at most very slightly broader than long.
m. Flowers clustered at the end of a long naked peduncle.
n. Peduncle conspicuously winged and ancipitous..... 24. E. ALLENII
nn. Peduncle not conspicuously winged and ancipitous..... 55. E. PANAMENSE
mm. Flowers not clustered at the end of a long naked peduncle.
n. Lamina of the lip cordate-orbicular, about as long as broad..... 68. E. RIGIDUM

nn. Lamina of the lip oblong-ovate, longer than broad..... 68a. E. RIGIDUM var. ANGUSTISEGMENTUM

kk. Floral bracts not conspicuous.
l. Inflorescence 1-flowered or subumbellate.
m. Lateral sepals narrowly lanceolate, long-acuminate; leaf-sheaths not dilated toward their summits; usually 1 flower open at a time; lip white..... 40. E. EBURNEUM
mm. Lateral sepals broadly lanceolate or oblanceolate to elliptic-oblong or ovate-oblong; leaf-sheaths dilated toward their summits.
n. Leaves semiterete and sulcate, linear-oblong..... 65. E. PUDICUM
nn. Leaves flat or conduplicate, usually ligulate to elliptic.
o. Leaf-sheaths strongly cuneate (viewed laterally), large and flaring, the folded sheath 2 cm. broad at junction with leaf; leaves strongly conduplicate, 2 cm. broad when folded..... 45. E. HUNTERIANUM
oo. Leaf-sheaths not broadly flaring, the folded sheaths less than 1 cm. broad at junction with the leaf; leaves more or less flat, usually not strongly conduplicate, when so, less than 1 cm. broad when folded.
p. Lamina of the lip distinctly broader than long, reniform to transversely oval..... 39. E. DIFFORME
pp. Lamina of the lip about as broad as long, suborbicular-cordate..... 39b. E. DIFFORME var. SIMULACRUM

ll. Inflorescence racemose or paniculate, mostly 3- or more flowered.
m. Lateral sepals 22 mm. or more long.
n. Lateral sepals narrowly lanceolate, long-acuminate; lip subentire, white..... 40. E. EBURNEUM
nn. Lateral sepals narrowly spatulate-oblanceolate, acute or obtuse; lip denticulate or crenate-dentate, orange-vermillion..... 64. E. PSEUDEPIDENDRUM
mm. Lateral sepals 16 mm. or less long.
n. Lip conduplicate; peduncle elongated; raceme elongated and narrow.
o. Apex of the lip broadly rounded and retuse-apiculate; lateral sepals with a dorsal keel toward the apex..... 28. E. CAROLII
oo. Apex of the lip short-acuminate; lateral sepals without a dorsal keel..... 63. E. PROBIFLORUM
nn. Lip not conduplicate, flat or at most somewhat convex..... 25. E. ANCEPS

Sect. I. ENCYCLIUM

1. EPIDENDRUM ABBREVIATUM Schltr. in Fedde Rep. Sp. Nov. 3:107. 1906.
Epidendrum prorepens Ames, Sched. Orch. 2:33. 1923.

Small, repent, epiphytic herbs up to 2.5 dm. tall. Pseudobulbs 3.5–10 cm. long and 0.3–1 cm. in diameter, fusiform, occasionally stipitate, normally bifoliate. Leaves 4–14 cm. long and 0.3–1.5 cm. broad, obtuse, ligulate, subcoriaceous. Inflorescence a short, 1- to 5-flowered raceme up to about 4 cm. long. Dorsal sepals 10–15 mm. long and 2.5–3.5 mm. broad, linear-oblanceolate, obtuse or acute,

often carinate dorsally along the midrib. Lateral sepals 10–15 mm. long and 3–4 mm. broad, linear-lanceolate, obtuse to acute. Lip unguiculate, the claw adnate to the column, free portion 7–10 mm. long and 5–8 mm. broad, ovate to oblong-ovate; disc with a conspicuous callus-thickening at the base.

Guatemala, Honduras, Costa Rica and Panama.

CHIRIQUÍ: Boquete District, alt. 1300 m., *Davidson 666;* "Chiriquí", alt. 1300 m., *Powell 152, 3560.* COCLÉ: vicinity of La Mesa, hills north of El Valle de Antón, alt. 1000 m., *Allen 2354.* VERAGUAS: Santa Fé, alt. 500 m., *Powell s. n.*

2. EPIDENDRUM ATROPURPUREUM Willd. Sp. Pl. 4:115. 1805; Ames, Hub. & Schweinf. Genus Epidendrum in U. S. & Mid. Am. 60. 1936.

Epidendrum auropurpureum Lindl. Gen. & Sp. Orch. Pl. 99. 1831.
Epidendrum macrochilum Hook. in Bot. Mag. 63: *t. 3534.* 1836.
Epidendrum macrochilum Hook. var. *roseum* Batem. Orch. Mex. & Guat. *t. 17.* 1839.
Encyclia atropurpurea Schltr. Orchideen, p. 208, *fig. 49.* 1914.
Encyclia atropurpurea var. *leucantha* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:45. 1922.
Encyclia atropurpurea var. *rhodoglossa* Schltr. loc. cit.

Robust caespitose epiphytic herbs. Pseudobulbs 3–8 cm. long or more and 1.5–5 cm. in diameter, ovoid, 1- to 3-leaved, usually bifoliate. Leaves 8–35 cm. long and 1.5–3.5 cm. broad, elliptic-ligulate or ligulate, obtuse or acute, coriaceous. Inflorescence a simple few- to many-flowered raceme up to 6 dm. long. Dorsal sepal 2.5–3.5 cm. long and 0.4–1.2 cm. broad, oblanceolate, obtuse. Lateral sepals similar to the dorsal but usually arcuate. Petals 2.5–3 cm. long and 0.7–1 cm. broad, oblanceolate to obovate, unguiculate, obtuse or acutish. Lip 3–5 cm. long and 1.8–4 cm. broad, 3-lobed, free nearly to the base of the column; lateral lobes oblong, obtuse or acute, relatively small, enfolding the column; mid-lobe large, variable, oblong to obovate to suborbicular to flabellate, always more or less emarginate.

Mexico, Guatemala, Salvador, Nicaragua, Costa Rica, Panama, the West Indies and in South America.

PROVINCE NOT KNOWN: "Panama", *Sinclair.* CHIRIQUÍ: between El Boquete and Caldera, alt. 300–700 m., *Pittier 3331.* COCLÉ: Penonome, alt. 15–300 m., *Williams 440.* PANAMÁ: Río Tecúmen, north of Chepo road, *Hunter and Allen 851;* San Juan, "all parts of the Pacific side", foothills east of city, *Powell 80, 148, 149, 3196, 3226.*

The copy of the Plumier plate (ed. Burmann) depicting this, which I have seen, is really not satisfactory for absolute identification. Lindley (Gen. & Sp. Orch. Pl. 100. 1831) had seen a copy of Plumier's plate in Lambert's herbarium and characterizes that of Burmann as a "caricature."

2a. EPIDENDRUM ATROPURPUREUM Willd. var. LACINIATUM Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 3:63. 1935.

Margins of the mid-lobe of the lip lacerate-dentate and the lateral lobes somewhat smaller than in the species (a malformation?).

Panama.

PANAMÁ: foothills east of Panamá City, alt. sea-level, *Powell 287.*

3. EPIDENDRUM BOOTHII (Lindl.) L. Wms. in Ann. Missouri Bot. Gard. 26:282. 1939.

Maxillaria Boothii Lindl. in Bot. Reg. 24: Misc. p. 52. 1838.
Dinema paleaceum Lindl. loc. cit. 26: Misc. p. 51. 1840.
Epidendrum auritum Lindl. loc. cit. 29: Misc. p. 4. 1843.
Epidendrum paleaceum Reichb. f. in Beitr. Orch. Centr.-Am. 80. 1866; Reichb. f. in Saunders Ref. Bot. 2: *t. 87.* 1869.
Nidema Boothii Schltr. in Fedde Rep. Sp. Nov. Beih. 17:43. 1922.

Repent or subcaespitose epiphytic herbs up to about 3 dm. tall. Rhizome creeping. Pseudobulbs up to about 5 cm. long, cylindric, fusiform or narrowly ovoid, stipitate, unifoliate. Leaves (when mature) 5–22 cm. long and 0.4–1.2 cm. broad, linear-ligulate, obtuse or acute, coriaceous. Inflorescence a 1- to few-flowered raceme; flowers small; bracts mostly 2–3 cm. long, lanceolate, cucullate, paleaceous, relatively large. Dorsal sepal 12–17 mm. long and 3–4 mm. broad, narrowly lanceolate to lanceolate, acute. Lateral sepals 11–15 mm. long and 2–3 mm. broad, linear-lanceolate to lanceolate, acute or acuminate, arcuate. Petals 7–12 mm. long and 2–4.5 mm. broad, lanceolate to elliptic-ovate, acute or acuminate. Lip 8–11 mm. long and 2–3.5 mm. broad, oblong-oblanceolate, obtuse or acute, slightly constricted above the middle, fleshy, bicarinate toward the base; disc often verrucose toward the apex.

From Mexico to Panama, the West Indies and northern South America, mostly at low elevations.

BOCAS DEL TORO: Río Cricamola, alt. about 10–15 m., *Woodson, Allen & Seibert 1892*; Isla Colón, *Wedel 123*; vicinity of Chiriquí Lagoon, *Wedel 1989*.

A species of low altitudes, often taken to be a *Maxillaria*.

4. EPIDENDRUM BRASSAVOLAE Reichb. f. in Bot. Zeit. 10:729. 1852; Hook. f. in Bot. Mag. 93: *t. 5664.* 1867.

Repent or caespitose epiphytic herbs up to about 5 dm. tall. Pseudobulbs up to 22 cm. long, from cylindric to ovoid, 2-, rarely 3-foliate. Leaves 12–26 cm. long and 2–4.5 cm. broad, oblong-ligulate to narrowly ovate, obtuse, coriaceous. Inflorescence a simple few-flowered raceme, exceeding the leaves; sheath inconspicuous, up to 12 cm. long. Sepals 3.5–5 cm. long and 0.3–0.5 cm. broad, linear-lanceolate, acute or acuminate, spreading. Petals similar to the sepals but slightly narrower. Lip 3–4.5 cm. long and 0.7–1.5 cm. broad, cuneate to a narrow base and adnate to the column for nearly the length of the column, simple; lamina 2–3 cm. long and up to 1.5 cm. broad, lanceolate-ovate, acuminate; claw with 2 short lamellate calluses.

Mexico, Guatemala, Honduras, Costa Rica and Panama.

CHIRIQUÍ: "Chiriquí Vulcan", *Warscewicz.*

This, like many another of Warscewicz's collections, is said to have come from Chiriquí, but has not been collected there since.

5. EPIDENDRUM CAMPYLOSTALIX Reichb. f. in Bot. Zeit. 10:730. 1852; in Saunders Ref. Bot. 2: *t. 86.* 1869; Summerhayes in Bot. Mag. 154: *t. 9243.* 1928.
Encyclia campylostalix Schltr. in Fedde Rep. Sp. Nov. Beih. 17:45. 1922.

Caespitose epiphytic herbs up to about 4.5 dm. tall. Pseudobulbs 2–12 cm. long and 2–4.5 cm. broad, ancipitous, narrowly oblong to ovoid, unifoliate. Leaves 4–30 cm. long and 1.3–8 cm. broad, elliptic, acute, subcoriaceous. Inflorescence an erect, 1- to many-flowered raceme subtended by a paleaceous sheath 1–7.5 cm. long; floral bracts 0.8–4 cm. long, linear to linear-lanceolate, acute, cucullate, paleaceous. Sepals similar, 16–20 mm. long and 3–4.5 mm. broad, linear-lanceolate, acute, the laterals slightly arcuate. Petals 13–17 mm. long and 1.5–2.5 mm. broad, ensiform to narrowly linear-oblanceolate, acute. Lip 12.5–18 mm. long and 6–9 mm. broad, unguiculate, only slightly adnate to the column at the base, 3-lobed; claw narrow, comprising about half the length of the lip; terminal portion of lip subquadrate in outline; lateral lobes from small and rounded to oblong, obtuse; mid-lobe rounded to obovate, disc with an inconspicuous callus thickening or low raised lamellae. Ovary conspicuously 3-winged.

Costa Rica and Panama.

CHIRIQUÍ: forests around El Boquete, alt. 1000–1300 m., *Pittier 3047*; "Chiriquí", alt. 1600 m., *Powell 74*.

This species is variable in size, and many specimens appear depauperate.

6. EPIDENDRUM CILIARE L. Syst. Nat., ed. 10:1246. 1759; Lindl. in Bot. Reg. 10: *t. 784*. 1824.

Auliza ciliaris Salisb. in Trans. Hort. Soc. Lond. 1:294. 1812.
Epidendrum cuspidatum Lodd. Bot. Cab. 1: *t. 10*. 1816; Lindl. in Bot. Reg. 10: *t. 783*. 1824.
Epidendrum viscidum Lindl. in Bot. Reg. 26: Misc. p. 81. 1840.
Phaedrosanthus ciliaris O. Ktze. in Post & Ktze. Lex. Gen. Phan. 429. 1904.

Repent or caespitose epiphytic herbs up to about 5 dm. tall. Pseudobulbs 8–22 cm. long and 0.6–2.2 cm. in diameter, cylindric, fusiform or tapering to the base, 1- to 2(–3)-leaved. Leaves 8–28 cm. long and 2–8 cm. broad, oblong-lanceolate, elliptic-oblong to oval, obtuse, coriaceous. Inflorescence a few- to several-flowered raceme; bracts 3.5–6.5 cm. long and 0.6–1.5 cm. broad, lanceolate to oblanceolate, cucullate, pergameneous. Sepals 35–85 mm. long and 1.5–6 mm. broad, linear to linear-lanceolate or linear-oblanceolate, acute or acuminate. Petals 35–70 mm. long and 1.5–5 mm. broad, linear-lanceolate to linear-oblanceolate, acute or acuminate. Lip 4–8 cm. long, 3–lobed, the base adnate to the column; lamina 3–6 mm. long, with 2 short lamellate calluses at the apex of the column; lateral lobes about 1.5–2.5 mm. long, each essentially reniform in outline or obliquely lanceolate-ovate, deeply dentate or usually lacerate; mid-lobe linear-filiform, up to 6 cm. long. Column with the clinandrium dentate or sublacerate.

Widely distributed and common from Mexico to Panama, through the West Indies and in South America.

CHIRIQUÍ: around El Boquete, alt. 1000–1300 m., *Pittier 3048*. "PROVINCE OF VERAGUAS AND CHIRIQUÍ": alt. 910–1210 m., *Powell 100, 3406*.

A variable species but a distinctive one. Often in cultivation. A putative hybrid between *E. ciliare* and *E. Parkinsonianum* is recorded.

Fig. 120. *Epidendrum ciliare*

6a. EPIDENDRUM CILIARE L. var. **Oerstedii** (Reichb. f.) L. Wms. comb. nov.

Epidendrum Oerstedii Reichb. f. in Bot. Zeit. 10:937. 1852.
Epidendrum costaricense Reichb. f. loc. cit.
Epidendrum Umlaufii Zahlbr. in Wien. Illustr. Gartenzeit. 18:209, *t. 2*. 1893.

Similar to *E. ciliare* except the lateral lobes of the lip reniform, entire or at most crenulate, and the mid-lobe from filiform to broadly oblanceolate.

Costa Rica and Panama.

CHIRIQUÍ: Boquete, alt. 1150 m., *Davidson 738*; Palo Alto, alt. 1360 m., *Powell 239, 3325, 3339*.

Although this is obviously only a variation of *E. ciliare*, in which the lateral lobes of the lip are entire (or nearly so) and in which the mid-lobe is usually broader, its relationship seems not to have been suspected in recent years. Perhaps this is because of the very evident but superficial character of lacerate lateral lobes of the lip in *E. ciliare* and the entire (and thus less conspicuous) ones in the variety.

7. EPIDENDRUM COCHLEATUM L. Sp. Pl., ed. 2:1351. 1763; Ames, Hub. & Schweinf. Genus Epidendrum in U. S. & Mid. Am. 79. 1936.

Extremely variable epiphytic herbs up to about 5 dm. tall. Pseudobulbs 3–25 cm. long and 0.5–4 cm. broad, cylindric to fusiform to ovoid, round or flattened in cross-section, bifoliate or rarely otherwise. Leaves 10–35 cm. long and 2–5 cm. broad, elliptic to lanceolate to oblanceolate, acute. Inflorescence from shorter to longer than the leaves, a simple to branched raceme, subtended by a sheath which may be up to 15 cm. long. Flowers rather pretty, lip purple-marked to almost black, sepals and petals white to green, occasionally purplish. Sepals similar, 2.5–7 cm. long and 0.2–0.7 cm. broad, linear to linear-lanceolate, acute, usually strongly reflexed. Petals 1.5–5 cm. long and 0.15–0.4 cm. broad, narrowly linear, occasionally broadest near the apex, acute. Lip 1–3 cm. long and 1–2.5 cm. broad, short-unguiculate, claw adnate to the column for about half its length; lamina cordate-orbicular, usually broader than long, obtuse or apiculate, cochleate, with a more or less prominent callus thickening under the end of the column. Ovary 3-winged, prominently so in fruit.

Mexico to Venezuela and Colombia; the West Indies.

DARIÉN: Cana and vicinity, *Williams 974*.

A common and variable species, curiously known by only one collection in Panama.

8. EPIDENDRUM CONDYLOCHILUM Lehm. & Kränzlin in Engler's Bot. Jahrb. 26:459. 1899.

Epidendrum tessellatum Batem. in Bot. Reg. 24: Misc. p. 7. 1838, non Roxb.; Hook. in Bot. Mag. 65: *t. 3638*. 1838.
Epidendrum Deamii Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:402. 1918; Ames, Hub. & Schweinf. Genus Epidendrum in U. S. & Mid. Am. 88. 1936.
Encyclia tessalata Schltr. loc. cit. 474, sphalm.

Repent or caespitose epiphytic herbs up to about 4 dm. tall. Pseudobulbs 2–15 cm. long and 0.3–1.5 cm. in diameter, cylindric to usually fusiform or narrowly ovoid, bi- to trifoliate. Leaves 6–25 cm. long and 0.5–2.5 cm. broad, linear to elliptic, acute or obtuse, usually erect. Inflorescence usually shorter than the leaves, simple or rarely branched, few- to many-flowered. Flowers small, dull-colored, variable. Dorsal sepal 8–12 mm. long and 1.5–3 mm. broad, linear to linear-lanceolate, acute. Lateral sepals 8–13 mm. long and 2–3 mm. broad, lanceolate to lanceolate-ovate, acute. Petals 8–10 mm. long and 1.5–4 mm. broad, linear-oblanceolate to oblanceolate, obtuse. Lip 8–12 mm. long and 4–6 mm. broad, obovate, obovate-oblong to oval in general outline, distinctly 3-lobed to almost simple, free from the column, provided with a long low puberulent callus extending from the base to about the middle of the lip, and mammillate calluses from the middle toward the apex, these last often arranged in 3 rows; lateral lobes from very small to quite prominent and explanate, obtuse; mid-lobe with the margins undulate. Ovary winged.

Mexico, Guatemala, Honduras, Costa Rica, Panama, Venezuela and Colombia.

CHIRIQUÍ: "Chiriquí", alt. 1050–1450 m., *Powell 93, 95, 3345, 3350, 3351, 3359.*

This species has gone under the name of *Epidendrum Deamii* Schltr. for many years. It is perhaps not distinct from *E. lividum* Lindl., being separated by the presence of more or less distinct lateral lobes on the lip. The degree of lip lobation is of dubious value, for several specimens show almost entire lip, including typical material of *E. condylochilum.*

9. EPIDENDRUM CRASSILABIUM Poepp. & Endl. Nov. Gen. & Sp. Pl. 2:1, *t. 102.* 1838.

Epidendrum variegatum Hook. in Bot. Mag. 59: *t. 3151.* 1832.
Epidendrum baculibulbum Schltr. in Fedde Rep. Sp. Nov. Beih. 19:116. 1923.

Erect repent or caespitose epiphytes up to about 70 cm. tall. Pseudobulbs 15–35 cm. long and 0.5–1.5 cm. in diameter, cylindric (often thickened at the base) to fusiform, bearing 2–4 widely separated leaves. Leaves 14–40 cm. long and 2.5–4 cm. broad, elliptic to oblong-lanceolate, erect or spreading. Inflorescence a simple raceme either shorter or longer than the subtending leaf. Sepals similar, 10–13 mm. long and 0.3–0.6 mm. broad, oblong to ovate to obovate, obtuse. Petals 7–13 mm. long and 2.5–6 mm. broad, oblanceolate to oblong-oblanceolate, obtuse, oblique. Lip 7–8 mm. long and 4–6 mm. broad, short-unguiculate, only slightly longer than the column; claw short, adnate to the column at the base; lamina orbicular to ovate, acute or obtuse, provided with a longitudinal callus at the base which is usually a single raised ridge and at the apex divided into two lamellae extending almost to the apex of the lip.

Costa Rica, Panama, the West Indies and to Brazil.

COCLÉ: El Valle de Antón, *Allen 2205, Woodson & Schery 204.*

10. EPIDENDRUM FRAGRANS Sw. Nov. Gen. & Sp. Prodr. 123. 1788.

Epidendrum fragrans Sw. var. *pachypus* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:32. 1922.

Repent or caespitose epiphytic herbs up to about 4 dm. tall. Pseudobulbs 4–11 cm. long and 0.5–3 cm. in diameter, variable, cylindric, cylindric-fusiform to ovoid, occasionally ancipitous, unifoliate. Leaves 8–30 cm. long and 1.5–5 cm. broad, ligulate to elliptic, obtuse, coriaceous. Inflorescence to 15 cm. long, shorter than the leaves, few- to several-flowered; sheaths up to 6 cm. long, chartaceous. Flowers greenish to yellowish, the lip usually lined with purple along the veins, sepals and petals rarely maculate. Sepals similar, 1.5–3.5 cm. long and 0.3–0.5 cm. broad, lanceolate or linear-lanceolate, acute or acuminate. Petals 2–3 cm. long and 0.5–1 cm. broad, broadly lanceolate to oblanceolate or obovate, acute or usually acuminate, unguiculate at the base. Lip 1.5–3 cm. long and 1–1.5 cm. broad, somewhat cochleate, base unguiculate and shortly adnate to the column; lamina ovate to ovate-subcordate, acuminate, provided with an inconspicuous callus at the base forming an inverted Y or with two small parallel calluses.

Mexico, Guatemala, Costa Rica, Panama, the West Indies and in South America to Brazil and Peru.

CANAL ZONE: *Maxon 4913;* San Juan and Frijoles, *Powell 30, 43, 3355, 3370, 3371, 3378, 3379, 3428, 3448, 3474;* Barro Colorado Island, *Shattuck 551.* COCLÉ: El Valle de Antón, *Allen 1678.*

11. EPIDENDRUM IONOPHLEBIUM Reichb. f. Beitr. Orch. Centr.-Am. 103. 1866.

Epidendrum pachycarpum Schltr. in Fedde Rep. Sp. Nov. 3:109. 1906.
Epidendrum Hoffmannii Schltr. loc. cit. 16:444. 1920.

Repent or caespitose epiphytic herbs up to about 4 dm. tall. Pseudobulbs 3–9 cm. long and 1.5–3 cm. broad, ovoid, rarely fusiform, bifoliate or rarely trifoliate. Leaves 10–35 cm. long and 1.5–4 cm. broad, ligulate or elliptic, obtuse. Inflorescence up to 15 cm. long, shorter than the leaves, few-to several-flowered. Flowers greenish to white with the lip more or less prominently lined with purple. Sepals similar, 1.4–3.5 cm. long and 0.3–0.8 cm. broad, lanceolate-ligulate to lanceolate, acute, the laterals somewhat oblique. Petals 1.2–2.4 cm. long and 0.4–0.9 cm. broad, elliptic-oblanceolate to oblanceolate, acute or acuminate. Lip 1.2–2.2 cm. long and 0.8–1.8 cm. broad, unguiculate; claw short, adnate to the column; lamina ovate to orbicular, obtuse or apiculate, cochleate, provided with an oblong-pandurate to quadrate, obscurely puberulent callus at the base under the apex of the column. Ovary angled, when mature alate.

In all Central American countries from Mexico to Panama and in Venezuela.

CANAL ZONE: near Frijoles, *Maxon 4724;* Culebra, alt. 50–100 m., *Pittier 3391;* San Juan, *Powell 187, 3182.* CHIRIQUÍ: Boquete District, alt. 1500 m., *Davidson 796;* "Chiriquí", *Powell 151, 187, 310, 3226, 3246, 3565.* VERAGUAS: San Francisco, alt. 300 m., *Powell 384.*

12. EPIDENDRUM ONCIDIOIDES Lindl. var. RAMONENSE (Reichb. f.) Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 3:103. 1935.

Epidendrum ramonense Reichb. f. Beitr. Orch. Centr.-Am. 81. 1866.
Encyclia ramonensis Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:473. 1918.
Encyclia Powellii Schltr. in Fedde Rep. Sp. Nov. Beih. 17:46. 1922.

Large caespitose epiphytic herbs up to about 1 m. tall. Rhizome short. Pseudobulbs up to about 10 cm. long, cylindric to usually ovoid, 2- to 4-foliate. Leaves 10–60 cm. long and 1–2.5 cm. broad, ligulate or ensiform, acute or obtuse. Inflorescence paniculate, exceeding the leaves, few- to many-flowered, simple or compound. Dorsal sepal 14–18 mm. long and 3.5–5 mm. broad, elliptic-lanceolate to oblong-lanceolate, acute or acuminate. Lateral sepals similar to the dorsal except somewhat arcuate. Petals 14–17 mm. long and 3–5.5 mm. broad, narrowly oblanceolate, acute or acuminate. Lip 12–15 mm. long; lateral lobes oblong, triangular-oblong, oblong-ovate or subquadrate-oblong, obtuse to truncate, arcuate; mid-lobe 7–10 mm. long and 6–8.5 mm. broad, ovate to suborbicular, obtuse to subacuminate; disc with 2 longitudinal fleshy ridges which form a fovea on the isthmus, extending onto the mid-lobe as thickened nerves. Column exauriculate, with terminal angles or with dentiform auricles.

Honduras, Costa Rica and Panama.

CHIRIQUÍ: "Chiriquí", alt. 1360–1510 m., *Powell 83*. COCLÉ: El Valle, alt. 1060 m., *Bouché 10*.

For all practical purposes this and the two following varieties might well be referred to *E. oncidioides* Lindl.

12a. EPIDENDRUM ONCIDIOIDES Lindl. var. GRAVIDUM (Lindl.) Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 3:104. 1935.

Epidendrum gravidum Lindl. in Jour. Hort. Soc. 4:114. 1849; Ames, Sched. Orch. 4:42, *t.* 2. 1923.
Encyclia gravida Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:472. 1918.
Epidendrum alanjense Ames, Sched. Orch. 1:13. 1922.
Encyclia Hunteriana Schltr. in Fedde Rep. Sp. Nov. Beih. 17:46. 1922.
Epidendrum amandum Ames, Sched. Orch. 4:36. 1923.
Epidendrum peraltense Ames, loc. cit. 46.

Similar to the preceding variety into which it intergrades, usually somewhat smaller in all parts. Mid-lobe of lip triangular-lanceolate to oblong. Veins of the mid-lobe verruculose.

Mexico, Honduras, Nicaragua, Costa Rica and Panama.

CHIRIQUÍ: Alanje, *Pittier s. n.*; David, *Powell 84, 3261, 3264, 3539, 3545*. PANAMÁ: San Juan Range, *Powell 271, 3479, 3485*.

12b. EPIDENDRUM ONCIDIOIDES Lindl. var. MOOREANUM (Rolfe) Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 3:106. 1935.

Epidendrum Mooreanum Rolfe in Kew Bull. 1891:199. 1891.
Encyclia Tonduziana Schltr. in Fedde Rep. Sp. Nov. Beih. 19:132. 1923.
Encyclia Brenesii Schltr., loc. cit. 221.

Much like the preceding variety. Lateral lobes of the lip spatulate or oblong-spatulate, veins verruculose.

Costa Rica and Panama.

CHIRIQUÍ: Volcán de Chiriquí, alt. 2120 m., *Davidson 879*; Lino Hill, alt. 1360 m., *Powell 292*.

Fig. 121. *Epidendrum oncidioides* var. *gravidum*

13. Epidendrum Ottonis Reichb. f. in Hamb. Gartenzeit. 14:213. 1858.

Nidema ottonis Britt. & Millsp. Bahama Fl. 94. 1920.
Nidema Boothii (Lindl.) Schltr. var. *triandrum* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:43. 1922.

Small, repent or caespitose epiphytic herbs up to about 25 cm. tall. Rhizome creeping. Pseudobulbs up to about 4 cm. long, fusiform, short-stipitate, unifoliate. Leaves 5–19 cm. long and 0.5–0.9 cm. broad, linear-ligulate, obtuse or acute, coriaceous. Inflorescence a short, few-flowered raceme; flowers small, white or yellowish; bracts mostly 1–2 cm. long, lanceolate, acuminate, paleaceous. Dorsal sepal 7–9 mm. long and 2.5–3 mm. broad, elliptic-lanceolate, acute. Lateral sepals 7–9 mm. long and 2–2.5 mm. broad, lanceolate, acuminate, more or less arcuate. Petals 6–7 mm. long and 1.5–2 mm. broad, elliptic, elliptic-lanceolate to oblanceolate, acute or acuminate, arcuate. Lip 6.5–7 mm. long and about 1.5 mm. broad, narrowly oblong, acute, subpandurate, fleshy, canaliculate, keeled toward the apex below. Column monandrous or triandrous, if triandrous then the lateral stamens usually imperfect.

Panama, the West Indies, Venezuela, Colombia and Peru.

Panamá: vicinity of Bejuco, *Allen 981*; east of Panamá City, *Powell 131, 3449*; swamp east of Tecúmen, *Standley 26611*; between Las Sabanas and Matías Hernández, *Standley 31888, 31945*.

Resembles *Epidendrum Boothii* (Lindl.) L. Wms. very much.

14. Epidendrum Parkinsonianum Hook. in Bot. Mag. 67: *t. 3778*. 1840.

Epidendrum aloifolium Batem. Orch. Mex. & Guat. *t. 25*. 1840, non L.
Epidendrum falcatum Lindl. var. *Zeledoniae* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:37. 1923.

Repent epiphytic herbs up to about 6 dm. long. Stems creeping, branched, cylindric or somewhat swollen. Leaves 15–50 cm. long and 1–4.5 cm. broad, ligulate to lanceolate-ligulate, acute, very thick, more or less flaccid, occasionally pustulate, usually pendent. Inflorescence a very short, few-flowered raceme; bracts short, ovate; pedunculate ovaries up to about 16 cm. long. Sepals 5.5–9 cm. long and 0.6–1.2 cm. broad, linear-lanceolate to linear, acute or acuminate, spreading. Petals 5–8 cm. long, similar to the sepals. Lip 6–8.5 cm. long (from the base of the column) and 3–4 cm. broad, 3-lobed, the base adnate to the column; lateral lobes 2.5–4 cm. long, broadly lunate to oblong-lunate; mid-lobe 3–6 mm. long, linear.

Mexico, Guatemala, Honduras, Costa Rica and Panama.

Chiriquí: Pueblo del Volcán, alt. 1800–1960 m., *Gaines*; Upper Río Chiriquí Viejo, vicinity of Monte Lirio, alt. 1300–1900 m., *Seibert 214, 217*.

A curious species with large and handsome flowers. It is allied to *E. ciliare* and *E. pugioniforme* but is easily distinguished from them by the flaccid, differently shaped leaves.

15. EPIDENDRUM PRISMATOCARPUM Reichb. f. in Bot. Zeit. 10:729. 1852; Reichb. f. Xenia Orch. 2:83, *t. 123*. 1862; Hook. in Bot. Mag. 88: *t. 5336*. 1862.

Stout repent or caespitose epiphytic herbs up to about 5 dm. tall. Pseudobulbs up to about 15 cm. long and 5 cm. in diameter, narrowly ovoid, often attenuated above, bi–trifoliate, the leaves somewhat separated on the apex of the bulb. Leaves 12–33 cm. long and 2–6 cm. broad, variable, from ligulate and oblanceolate-oblong to narrowly ovate, obtuse, coriaceous. Inflorescence an erect, few- to many-flowered raceme. Dorsal sepals 22–44 mm. long and 3–5 mm. broad, narrowly lanceolate to narrowly oblanceolate, acute, arcuate. Petals 20–28 mm. long and 3–5 mm. broad, elliptic-linear to lanceolate, acute, arcuate. Lip 18–25 mm. long and 7–9 mm. broad, 3-lobed, free from the column nearly to the base, subsagittate, with a central callus from the base nearly to the apex; middle lobe large, trulliform, acuminate.

Costa Rica and Panama.

CHIRIQUÍ: "Province of Chiriquí", alt. 1200–1360 m., *Powell 99, 101, 3375, 3388, 3391, 3402;* "Chiriquí", *Warscewicz;* near El Volcán, *White 203;* Casita Alta to Cerro Copete, alt. 2300–3300 m., *Woodson & Schery 375.*

Allied to *E. brassavolae*. One of the commonest of the Epidendrums in cultivation in greenhouses. It is a good bloomer and grows well, the flowers occasionally being sold as cut flowers in the northern markets.

16. EPIDENDRUM PYGMAEUM Hook. in Bot. Mag. 60: *t. 3233*. 1833; Hook. Jour. Bot. 1:49, *t. 118*. 1834; Ames, Hub. & Schweinf. Genus Epidendrum in U. S. & Mid. Am. 160. 1936.

Hormidium pseudopygmaeum Finet in Bull. Herb. Boiss. 7:121, *t. 3*. 1899.

Small repent epiphytic herbs from a creeping rhizome. Pseudobulbs scattered along the rhizome, 2–10 cm. long, cylindric to fusiform, bifoliate. Leaves 2–15 cm. long and 0.7–2 cm. broad, narrowly elliptic to oblong-oval, obtuse to acute. Inflorescence sessile in the axils of the leaves, a short few- to several-flowered raceme. Flowers small, inconspicuous. Dorsal sepal 5–10 mm. long and 1.5–3 mm. broad, lanceolate, acuminate. Lateral sepals 6–12 mm. long and 2–4 mm. broad, lanceolate, acuminate, keeled dorsally toward the apex, shortly connate at the base and lightly adnate to the base of the column. Petals 4–8 mm. long and 0.5–1 mm. broad, linear, acute. Lip 3–8 mm. long and 3–7 mm. broad, clawed at the base and shortly adnate to the base of the column; lamina 3-lobed or 3-lobulate; lateral lobes explanate or erect, ovate to orbicular; mid-lobe small, apiculate. Ovary winged.

Florida and Mexico to Panama, the West Indies and to Brazil and Bolivia.

CHIRIQUÍ: vicinity of Monte Lirio, *Seibert 239*. COCLÉ: El Valle, *Seibert 426;* near El Volcán, *White 205*.

A variable and widely distributed species. There seem to be two forms of this,—one compact and small, the other rather loose and comparatively large. The second form is Finet's *Hormidium pseudopygmaeum*.

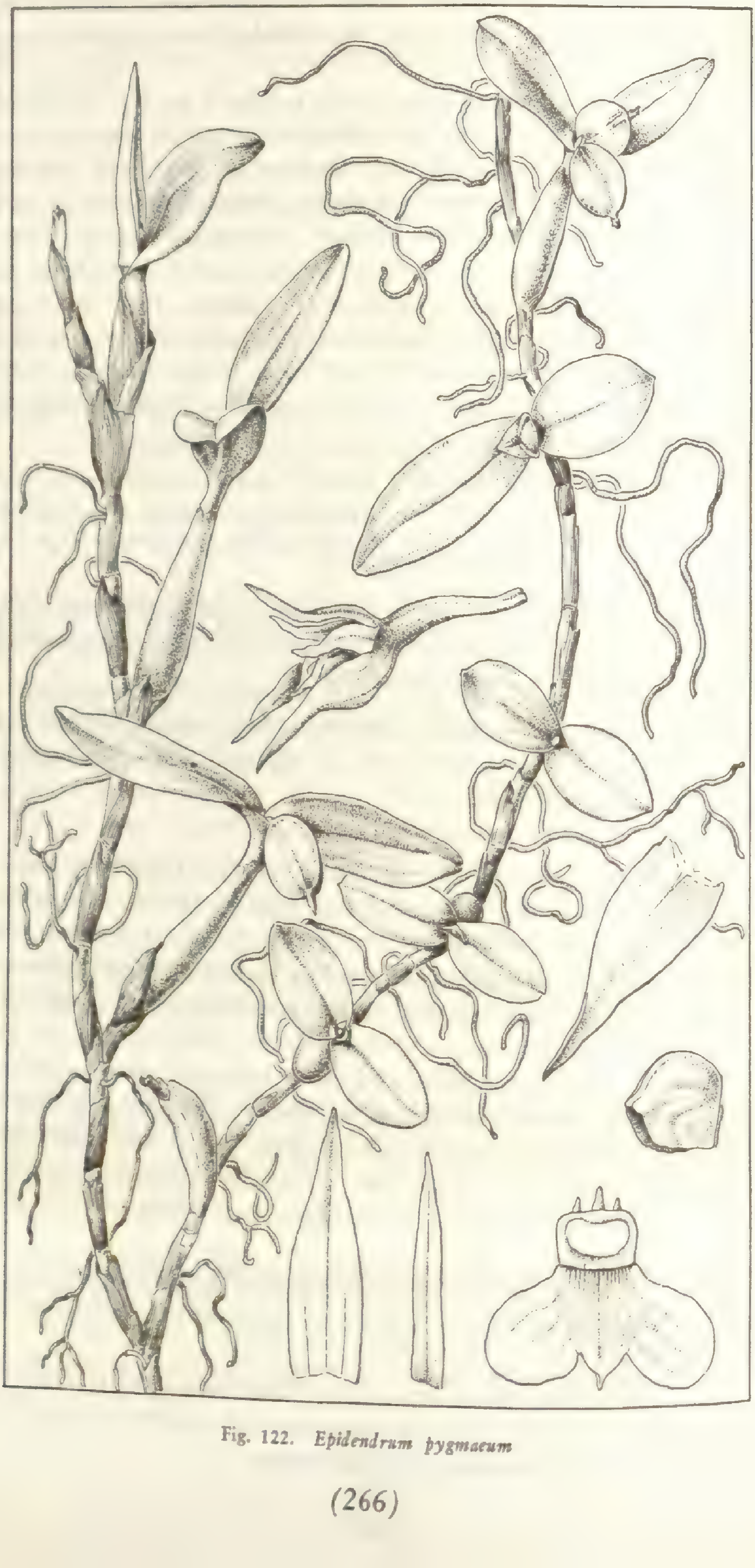


Fig. 122. *Epidendrum pygmaeum*

17. EPIDENDRUM ROUSSEAUAE Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:407. 1918; Ames, Hub. & Schweinf. Genus Epidendrum in U. S. & Mid. Am. 170. 1936.

Epiphytic herbs similar to *E. ramosum* Jacq. Leaves ligulate, about 7 cm. long and 1.2 cm. broad, obtuse. Inflorescence a lax several-flowered raceme up to about 10 cm. long. Flowers fleshy, greenish. Sepals about 1.2 cm. long, lanceolate-ligulate, acute, fleshy. Petals about 1.2 cm. long, linear or linear-oblanceolate. Lip unguiculate; claw adnate to the column; lamina about 7 mm. long and as broad, trilobate, provided with 2 parallel calluses extending from the base up to the base of the mid-lobe, base deeply cordate; lateral lobes spreading, dolabriform, obtuse; terminal lobe about 4 mm. long and 3.5 mm. broad, extended into a sub-orbicular blade from a broadly ligulate claw, obtuse, apiculate.

Panama.

CANAL ZONE: *Mrs. Rousseau, s. n.*

The description is taken from the original publication. Specimens are missing from the Ames Herbarium but Ames, Hubbard & Schweinfurth have cited the following collections from Panama: *Powell 112, 3393; Münch 27164; Shattuck 347.*

Curiously enough, Schlechter contrasts this species with *Epidendrum ramosum* Jacq., which belongs to the section EUEPIDENDRUM, while Ames, Hubbard anad Schweinfurth have placed it in the section ENCYCLIUM.

18. EPIDENDRUM SPONDIADUM Reichb. f. in Bot. Zeit. 10:731. 1852; Hook. f. in Bot. Mag. 119: *t. 7273.* 1893.

Epidendrum platycardium Schltr. in Fedde Rep. Sp. Nov. Beih. 17:36. 1922.

Repent or caespitose epiphytic herbs up to about 35 cm. tall. Pseudobulbs 3–12 cm. long and 0.6–1.3 cm. broad, cylindric to narrowly ovoid, unifoliate. Leaves 10–28 cm. long and 2.5–5 cm. broad, ensiform to elliptic, obtuse. Inflorescence shorter than the leaves, few-flowered; sheath about 2.5 cm. long. Flowers with sepals and petals greenish to white and the lip rose to purple. Sepals 13–20 mm. long and 3–6 mm. broad, lanceolate, acuminate or acute, the laterals oblique. Petals 12–17 mm. long and 3.5–6.5 mm. broad, lanceolate to lanceolate-ovate, acute or acuminate. Lip 12–15 mm. long and 10–12 mm. broad, short-unguiculate; claw adnate to the column; lamina suborbicular-reniform to cordate, apiculate, provided with a small subfoveate callus under the apex of the column which usually has 3 thickened nerves extending outward.

Costa Rica, Panama and possibly Jamaica.

CHIRIQUÍ: Palo Alto Hill, alt. 1500 m., *Powell 141.*

Very closely allied to *Epidendrum fragrans* Sw. and perhaps only a variation of that.

19. EPIDENDRUM STAMFORDIANUM Batem. Orch. Mex. & Guat. *t. II.* 1838; Hook. in Bot. Mag. 80: *t. 4759.* 1854.

Epidendrum Cycnostalix Reichb. f. in Bot. Zeit. 10:731. 1852.

Caespitose epiphytic herbs up to about 50 cm. tall. Stems pseudobulbose, 8–27 cm. long and about 0.5–2 cm. in diameter, cylindric-fusiform to fusiform, bearing 1–4 leaves at or near the apex. Leaves 10–27 cm. long and 3–7 cm. broad, variable, ligulate, elliptic, oblong-lanceolate, or oblanceolate to oval, obtuse, coriaceous. Inflorescence up to about 60 cm. long, spreading or pendent, simple or paniculate, usually many-flowered, lateral from a short fertile shoot, or rarely terminal on the pseudobulb. Flowers rather pretty, fair-sized. Dorsal sepal 15–18 mm. long and 4–6 mm. broad, elliptic or lanceolate, acute or acuminate. Lateral sepals 14–18 mm. long and 4–6 mm. broad, lanceolate or oblong-lanceolate, strongly oblique, acute or acuminate. Petals 14–18 mm. long and 1.5–4.5 mm. broad, linear, elliptic, linear-oblong to lanceolate, acute. Lip unguiculate; claw adnate to the column; lamina 11–16 mm. long and 13–20 mm. broad, 3-lobed; lateral lobes large, spreading, oblong, oblique, obtuse, entire or crenulate; mid-lobe bilobulate, retuse, transversely oblong in outline, provided with a narrow, often cuneate claw at the base, entire or usually crenulate or serrulate; disc provided with a pair of parallel, short, lamellate calluses, or a single deeply sulcate callus at the base near the apex of the column, and with the median nerve thickened or raised into a low lamella.

Mexico to Panama, Venezuela and Colombia.

CHIRIQUÍ: "Chiriquí", *Warscewicz.*

No recent Panamanian collections seen. The species grows well in cultivation.

20. EPIDENDRUM STANGEANUM Reichb. f. in Gard. Chron. n. s. 15:462. 1881.
Epidendrum glandulosum Ames, Sched. Orch. 7:5, *t. 20.* 1924.

Small repent or caespitose epiphytic herbs from a slender creeping rhizome, up to 2 dm. tall. Pseudobulbs 1.5–5 cm. long and 0.1–0.5 cm. in diameter, cylindric to narrowly fusiform, covered with marcescent sheaths, becoming naked with age, unifoliate. Leaves 4–12 cm. long and 1–3 mm. broad (or in diameter), linear and flattened or appearing terete due to their inrolled margins. Inflorescence a few- to several-flowered raceme, shorter than the subtending leaf; flowers small and inconspicuous. Dorsal sepals 5–6 mm. long and 1.5–2 mm. broad, lanceolate, acute, sparsely glandular dorsally. Lateral sepals 6–7 mm. long and 2–3 mm. broad, oblique, lanceolate, acute or acuminate, sparsely glandular dorsally. Petals 4.5–5.5 mm. long and 0.5–0.7 mm. broad, linear, acute. Lip 5–6 mm. long and 3–3.5 mm. broad, unguiculate; claw short, adnate to the column; lamina deltoid to ovate-lanceolate, apiculate, slightly cochleate, without calluses.

Costa Rica and Panama.

CANAL ZONE: on trail from Colón, *Powell 338;* (record without data), *Shattuck 454.*

21. EPIDENDRUM VARICOSUM Batem. in Bot. Reg. 24: Misc. p. 30. 1838; Lindl. Folia Orch. Epid. 23. 1853; Reichb. f. Xenia Orch. 1:163, *t. 56*. 1856.

Epidendrum chiriquense Reichb. f. in Bot. Zeit. 10:730. 1852, Xenia Orch. 1:164, *t. 67*. 1856.

Encyclia chiriquensis Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:472. 1918.

Small to large, repent or caespitose, epiphytic herbs up to about 1 m. tall. Pseudobulbs up to 25 cm. long, usually ovoid at the base and prolonged into a long slender neck above, 3- to 4-leaved. Leaves 5–35 cm. long and 1.5–5 cm. broad, linear-lanceolate to elliptic, acute or acuminate. Inflorescence simple or branched, shorter or longer than the leaves. Dorsal sepal 8–18 mm. long and 3–5 mm. broad, oblong to oblong-lanceolate, acute or obtuse. Lateral sepals 8–16 mm. long and 3–5 mm. broad, oblong to oblong-ovate, oblique, obtuse or acute. Petals 8–14 mm. long and 2–5 mm. broad, oblanceolate to narrowly obovate, obtuse, usually oblique. Lip 9–15 mm. long and 6–13 mm. broad, cuneate, narrowed to the base and shortly connate with the base of the column, 3-lobed; lateral lobes arising near the middle of the lip, usually small and explanate. Mid-lobe relatively large, bifid, and the lobules more or less explanate and flabellate; disc with a large central callus and with mammillate or varicose processes or lamellae from the middle extending out to the lobules of the mid-lobe. Ovary angled or narrowly winged in fruit.

Mexico, Guatemala, Salvador, Honduras, Costa Rica and Panama.

CHIRIQUÍ: "Chiriquí", *Warscewicz*.

Reichenbach first gave the origin of *Epidendrum chiriquense* as "Costa Rica und Chiriqui" and later as "Chiriqui: v. Warscewicz". The species has not been seen from Costa Rica or Panama since and the basis of *E. varicosum* in Panama is based on his record.

22. EPIDENDRUM VOLUTUM Lindl. & Paxt. in Paxton's Flow. Gard. 2:151, *fig. 215*. 1851–52.

Epidendrum Radlkoferianum Schltr. in Fedde Rep. Sp. Nov. 17:142. 1921.

Erect epiphytic herbs 18–25 cm. tall. Pseudobulbs when young 5–10 cm. long and 0.5–0.6 cm. in diameter, cylindric. Leaves 6–8 cm. long and 0.8–1 cm. broad, ligulate, acute, coriaceous. Inflorescence a lax raceme of 6–10 flowers, about 13 cm. long; peduncle 2–4 cm. long. Sepals about 1.8 cm. long and 0.3 cm. broad, narrowly oblong-ligulate, acuminate, the laterals oblique. Petals about as long as the sepals, linear, narrow and oblique, acuminate. Lip unguiculate; claw adnate to the column; lamina about 9 mm. long and 11 mm. broad, obscurely 3-lobed, subreniform-cordate, apiculate, apex triangular, apical part subcrenate and undulate; disc provided with 2 short, obtuse, parallel, lamellate calluses at the base and 3 approximate linear calluses extending up to about the middle.

Panama.

CHIRIQUÍ: "im Veragua- und Chiriquí-Distrikt", alt. 1000–1200 m., *Powell 89;* "Provinz Chiriquí", *Wagner.*

The description is taken from Schlechter's description of *E. Radlkoferianum.* The specimens indicated above are those cited by Schlechter.

Sect. II. Barkeria

23. Epidendrum stenopetalum Hook. in Bot. Mag. 62: *t. 3410.* 1835; Ames, Hub. & Schweinf. Genus Epidendrum in U. S. & Mid. Am. 179. 1936.

Dimerandra stenopetala Schltr. in Fedde Rep. Sp. Nov. Beih. 17:44. 1922.

Slender, caespitose, epiphytic herbs up to about 4 dm. tall. Stems terete, cylindric, cane-like, often somewhat flexuose, leafy. Leaves 3.5–14 cm. long and 0.4–1 cm. broad, linear or ligulate to linear-oblong or linear-lanceolate, obtuse, unequally bilobulate at the apex, scattered along the stem, one at each node. Inflorescence a short, few-flowered raceme. Dorsal sepal 10–13 mm. long and 3.5–4.5 mm. broad, lanceolate or elliptic-lanceolate, acute or acuminate. Lateral sepals 10–13 mm. long and 3.5–4.5 mm. broad, lanceolate to lanceolate-ovate, acute or acuminate, somewhat oblique. Petals 11–13 mm. long and 6–6.5 mm. broad, obovate to subrhombic, acute or acuminate. Lip 11–13 mm. long and 8–9.5 mm. broad, obovate to obovate-flabellate, truncate; disc obscurely lined. Column short, the clinandrium with 2 large lateral lobes.

Mexico, Guatemala, British Honduras, Honduras, Costa Rica, Panama, the West Indies and South America at low elevations.

BOCAS DEL TORO: Water Valley, *Wedel 765.* CANAL ZONE: drowned forest near Vigía and San Juan on Río Pequeni, *Dodge, Steyermark & Allen 16586;* hills near Panamá City, *Powell 17, 3451;* Las Cruces trail, *Standley 29101;* between France Field and Corozal, *Standley 30448.* PANAMÁ: swamp east of Río Tecúmen, *Standley 26610.*

This species is placed in section Barkeria by Ames, Hubbard & Schweinfurth (loc. cit.), but it has little relationship to the other species of the section; it would perhaps be best placed in a section by itself.

III. Section Euepidendrum

24. Epidendrum Allenii L. Wms. in Ann. Missouri Bot. Gard. 28:418, *t. 22, figs. 3–5.* 1941.

Erect epiphytic herbs up to about 3 dm. tall. Stems ancipitous, covered with the bases of the 3 to 6 leaves. Leaves 4–12 cm. long, 1.2–3 cm. broad, elliptic to lanceolate, acute or short-acuminate. Peduncle about 10–15 cm. long, ancipitous, bialate, the wings prominent at the base but disappearing at about the middle of the peduncle. Inflorescence short, the rachis covered with the scarious, imbricated bracts; bracts up to about 1 cm. long. Dorsal sepal about 10 mm. long and 4 mm. broad, lanceolate, obtuse, 5- to 7-nerved, with a short dorsal apicule near the apex. Lateral sepals similar to the dorsal sepal except somewhat arcuate. Petals about 10 mm. long and 0.75 mm. broad, linear, 1-nerved. Lip unguiculate; the lamina about 10 mm. long and 12 mm. broad, subreniform, subentire or ob-

Fig. 123. *Epidendrum ellipsophyllum* and *E. Allenii*

Fig. 124. *Epidendrum anceps*

scurely 3-lobed, the terminal lobe inconspicuous and slightly retuse, with 2 approximate submammillar calluses at the base. Column of the section, about 7 mm. long.

Panama.

COCLÉ: hills north of El Valle de Antón, alt. 1000 m., *Allen 2203, 2310.*

25. EPIDENDRUM ANCEPS Jacq. Select. Stirp. Am. 224, *t. 138.* 1763; Ames, Hub. & Schweinf. Genus Epidendrum in U. S. & Mid. Am. 56. 1936.

Epidendrum musciferum Lindl. in Hook. Jour. Bot. 1:6. 1834.

Epiphytic herbs up to about 1 m. tall. Stems slender to rather coarse, covered with the amplexicaul leaf-sheaths, usually ancipitous. Leaves 4–25 cm. long and 1–5 cm. broad, ligulate to elliptic-lanceolate, acute or obtuse, those at the middle of the stem or above usually largest, the lower ones reduced. Inflorescence usually long-pedunculate (up to 45 cm.), simple or branched, racemose or subcapitate; peduncle ancipitous, covered with scarious sheaths. Dorsal sepal 5–10 mm. long and 2–3.5 mm. broad, elliptic to elliptic-ovate, acute or obtuse. Lateral sepals 6–10 mm. long and 2–4 mm. broad, oblong-lanceolate to ovate, obtuse or acute, oblique, semi-cochleate. Petals 4–9 mm. long and 0.5–1.5 mm. broad, filiform to linear-oblanceolate. Lip unguiculate; claw adnate to the column; lamina 3–6 mm. long and 4–7.5 mm. broad, reniform to cordate-suborbicular, 3-lobed; the lateral lobes rounded, fleshy; terminal lobe subquadrate to oblong, entire, retuse or doubly retuse; disc fleshy, usually with a low longitudinal callus from base to apex.

Florida and Mexico through Central America and the West Indies to Brazil and Peru.

BOCAS DEL TORO: Old Bank Island, *Wedel 2081;* Bastimentos Island, *Wedel 2921.* CANAL ZONE: Gatún Lake, Frijoles, San Juan, Fort Sherman, *Powell 40, 41, 3349, 3366, 3367;* Barro Colorado Island, *Woodworth & Vestal 66A.* CHIRIQUÍ: Lino Hill, alt. 1200–1500 m., *Powell 299.* PANAMÁ: Cerro Campana, alt. 1000 m., *Allen 2452;* Panamá City, *Kieswetter s. n.*

26. EPIDENDRUM BISULCATUM Ames, Sched. Orch. 5:24, *t. 5.* 1923.

Small, branched, epiphytic herbs up to about 50 cm. long. Stems slender, much branched, covered with the scarious leaf-sheaths when young, becoming naked with age. Leaves 4–10 cm. long and 0.6–2 cm. broad, elliptic to lanceolate to oblanceolate, acute. Inflorescence shorter than the leaves, 1- to few-flowered, borne on a short winged peduncle. Flowers greenish, the lip with a purple cast. Dorsal sepal 7–10 mm. long and 3–6 mm. broad, oval to oblong-ligulate, acutish. Lateral sepals 10–12 mm. long and 3–6 mm. broad, oblong to oblong-oval, oblique, acute. Petals 7–10 mm. long and 1.5–2 mm. broad, linear, obtuse. Lip unguiculate; the claw adnate to the column; lamina 7–10 mm. long and 9–13 mm. broad, suborbicular-cordate, crenulate, obscurely emarginate, fleshy, provided with 2 (or 3) submammillate calluses at the base which are prolonged into low

Fig. 125. *Epidendrum bisulcatum*

fleshy keels and with a low keel passing between the mammillae.

Panama.

CHIRIQUÍ: Bajo Chorro, Boquete District, alt. 1800 m., *Davidson 122, 322;* Palo Alto Hill, alt. 1800 m., *Powell 280, 281.*

27. EPIDENDRUM CALIGARIUM Reichb. f. in Gard. Chron. 1869:1110. 1869; Ames, Sched. Orch. 9:48, *fig. 8.* 1925.

Caespitose epiphytic herbs up to about 80 cm. long. Stems slender, strict, covered with loosely appressed sheaths, the sheaths densely maculated with minute, purple, papillose or tuberculate excrescences. Leaves 1.5–6 cm. long and 0.3–0.6 cm. broad, linear or linear-lanceolate, borne near the apex of the stem. Inflorescence exceeding the leaves, a densely flowered simple or branched raceme. Sepals

Fig. 126. *Epidendrum caligarium*

5–6 mm. long and 2.5–3 mm. broad, oval, obtuse or obscurely apiculate. Petals 5–6 mm. long and about 1.5 mm. broad, elliptic-oblanceolate. Lip unguiculate; the claw adnate to the column; lamina 6–8 mm. long and 8–10 mm. broad, more or less orbicular in outline, 3-lobed, the lateral lobes deeply lacerate, often cut nearly to the middle of the lip, each lobe often 4-partite, mid-lobe deeply retuse, the lateral lobules denticulate or laciniate; disc provided with 2 small antrorse, submammillate calluses at the base.

Known definitely only from Panama.

VERAGUAS: San Juan, alt. 360 m., *Powell 380.*

28. EPIDENDRUM CAROLII Schltr. in Fedde Rep. Sp. Nov. Beih. 19:35. 1923.

Erect, caespitose, epiphytic herbs up to about 40 cm. tall. Stems 3–12 cm. long, slender, covered with the scarious leaf-sheaths, becoming naked with age, bearing leaves toward the apex. Leaves 2.5–8 cm. long and 0.7–2 cm. broad, elliptic-lanceolate or oblong. Inflorescence up to 30 cm. long, long-pedunculate, a simple or branched raceme; peduncle ancipitous, covered with several equitant scarious bracts. Flowers small, usually purplish with a yellow lip. Dorsal sepal 5–6 mm. long and 1.5–2 mm. broad, lanceolate to oblong, acute or obtuse. Lateral sepals similar to the dorsal but oblique. Petals 3–5 mm. long and 1–1.8 mm. broad, linear to linear-oblong, slightly arcuate, obscurely denticulate. Lip unguiculate; claw adnate to the column; lamina 4–5 mm. long and as broad, ovate-cordate, crenulate, fleshy, the disc with a longitudinal callus well developed and joining the two erect lateral lobes of the lip.

Mexico, Costa Rica and Panama.

CHIRIQUÍ: Boquete, alt. 1150 m., *Davidson 1058*.

29. EPIDENDRUM CENTRADENIA Reichb. f. in Walp. Ann. 6: index p. 1163. 1865.

Oerstedella centradenia Reichb. f. in Bot. Zeit. 10:932. 1852.
Epidendrum tenuiflorum Schltr. in Fedde Rep. Sp. Nov. 3:49. 1906.

Caespitose or spreading and proliferous epiphytic herbs up to 0.5 m. or perhaps longer. Stems slender, covered with the amplexicaul, minutely papillose or tuberculate leaf-sheaths, becoming naked with age, simple or branched, bearing leaves mainly toward the apex of the new growths. Leaves 2–9 cm. long and 0.2–0.8 cm. broad, linear to linear-lanceolate, acute. Inflorescence 1- to few-flowered; flowers lilac-colored. Sepals 7–10 mm. long and 2–3 mm. broad, linear-lanceolate, acute. Petals 7–10 mm. long and 1.5–2 mm. broad, linear-oblanceolate, obtuse, slightly oblique. Lip 10–18 mm. long and 9–17 mm. broad, unguiculate; the narrow claw adnate to the column; lamina 3-lobed, lateral lobes small, about 3 mm. long, explanate, mid-lobe relatively large, deeply retuse and with the two large divaricate lobules cuneate to the junction with the lateral lobes; disc provided with a small hood-shaped tridentate callus at the base of the lamina. Column with a large hood-shaped or calyptriform clinandrium.

Costa Rica and Panama.

CHIRIQUÍ: "Province of Chiriquí", alt. 1200 m., *Powell 139*.

30. EPIDENDRUM CENTROPETALUM Reichb. f. in Bot. Zeit. 10:732. 1852.

Oerstedella centropetala Reichb. f. loc. cit. 932.
Epidendrum aberrans Schltr. in Fedde Rep. Sp. Nov. 15:206. 1918.
Epidendrum leprosum Schltr. in Fedde Rep. Sp. Nov. Beih. 19:38. 1923.

Caespitose or repent epiphytic herbs up to 65 cm. tall. Stems slender, covered with the leaf-sheaths or naked with age, simple or branched, bearing leaves mainly toward the apex; leaf-sheaths verrucose or tuberculate. Leaves 2.5–8 cm. long and 0.3–1.5 cm. broad, linear-lanceolate to lanceolate, acute or obtuse. Inflores-

cence a simple few- to several-flowered raceme exceeding the leaves; flowers small, rose to purple. Dorsal sepal 7–9 mm. long and 2–3 mm. broad, elliptic to oblanceolate, obtuse or acute. Lateral sepals 7–10 mm. long and 2–3.5 mm. broad, oblong or oblanceolate, acute, arcuate. Petals 6–9 mm. long and 1–2.3 mm. broad, linear-oblanceolate, obtuse. Lip unguiculate, strongly 3-lobed; claw at the base adnate to the column, free above, fleshy and provided with a raised sulcate and retuse callus reaching to about the lateral lobes; lamina strongly 3-lobed, the mid-lobe strongly bilobed, lateral lobes 2–4 mm. long, explanate, oblong, obtuse; terminal lobe clawed and the two lobules explanate to recurved, the lobules oblong, obtuse or acute. Column provided with a hood-shaped or calyptriform clinandrium.

Guatemala, Honduras, Costa Rica and Panama.

CHIRIQUÍ: Chiriquí Volcano, *Warscewicz.*

31. EPIDENDRUM COCLÉENSE Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 4:6. 1936.

Scandent epiphytic herbs up to about 2.5 m. long. Stems simple or branched, covered with the amplexicaul leaf-sheaths or naked with age. Leaves 4–10 cm. long and 4–6 mm. broad, linear or ensiform, acute. Inflorescence short, 1- to 3-flowered, shorter than the subtending leaves; sheath up to 15 cm. long, subimbricated, scarious, cucullate, exceeding the pedicels of the flowers. Dorsal sepals about 8 mm. long and 2.5 mm. broad, linear-oblong, obtuse. Lateral sepals about 10 mm. long and 3.5 mm. broad, lanceolate, acute, shortly alate-keeled dorsally at the apex. Petals about 8 mm. long and 2 mm. broad, oblanceolate, acute. Lip unguiculate, fleshy; claw adnate to the column; lamina about 6 mm. long and 4 mm. broad, oblong-ovate, simple, obtuse, provided with a small tridentate callus under the apex of the column, the middle tooth of which is prolonged into a longitudinal carina.

Panama.

COCLÉ: El Valle de Antón, alt. 500 m., *Hunter & Allen 389.*

32. EPIDENDRUM CONFERTUM Ames & Schweinf. Sched. Orch. 10:61. 1930.

Epidendrum prostratum Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:407. 1918, non Cogn.

Branched or simple, prostrate epiphytic herbs up to 50 cm. long. Stems slender, densely leaved, covered with the amplexicaul leaf-sheaths. Leaves 8–15 mm. long and 3–6 mm. broad, oblong-ligulate to ovate, acute to aristate. Inflorescence usually a single flower at the apex of the stem or branches. Sepals 8–9 mm. long and 2–2.5 mm. broad, lanceolate-ligulate, acute. Petals about 8 mm. long and 1 mm. broad, linear, obtuse or acute, broadest near the apex. Lip unguiculate; claw adnate to the column; lamina about 5 mm. long and as broad, orbicular-cordate, slightly cochleate.

Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, Boquete District, alt. 1800 m., *Davidson 246.*

33. EPIDENDRUM CONGESTUM Rolfe in Kew Bull. 1913:29. 1913.

Epidendrum serruliferum Schltr. in Fedde Rep. Sp. Nov. Beih. 19:44. 1923.

Small, densely caespitose herbs up to 7 cm. tall. Stems short, covered with the broad equitant bases of the leaves. Inflorescence 1- to few-flowered, sessile in the axils of the terminal leaves. Leaves 8–30 mm. long and 4–8 mm. broad, linear-oblong to oblong-oval, obtuse, approximate, semi-equitant, spreading, fleshy. Dorsal sepal 7–9 mm. long and 3–4 mm. broad, lanceolate, acute to acuminate. Lateral sepals 8–10 mm. long and 2–3 mm. broad, lanceolate, cucullate, alate-keeled dorsally and the keel denticulate, oblique, connate at the base with the claw of the lip. Petals 7–8 mm. long and 2–2.5 mm. broad, lanceolate, acute, minutely denticulate. Lip 7–10 mm. long, long-unguiculate; claw adnate to the column but exceeding it slightly; lamina 4–5 mm. long and 3–4 mm. broad, lanceolate-cordate to cordate, acute or acuminate, fleshy, lobes more or less erect. Clinandrium not fimbriate.

Costa Rica and Panama.

COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 1247*.

34. EPIDENDRUM CORIIFOLIUM Lindl. in Jour. Hort. Soc. Lond. 6:218, *fig. 1851*; Summerhayes in Bot. Mag. 160: *t. 9477*. 1937.

Epidendrum magnibracteatum Ames, Sched. Orch. 1:16. 1922, non Kränzlin.
Epidendrum coriifolium Lindl. var. *purpurascens* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:31. 1922.
Epidendrum fuscopurpureum Schltr. loc. cit. 32.
Epidendrum palmense Ames, loc. cit. 2:33. 1923.
Epidendrum subviolascens Schltr. loc. cit. 19:219. 1923.

Erect, caespitose or repent, epiphytic herbs up to about 40 cm. tall. Stems indurated, covered toward the base with sub-scarious sheaths and above by the amplexicaul leaf-sheaths, bearing 2–4 leaves above. Leaves 7–30 cm. long and 1–4.5 cm. broad, ligulate or ligulate-oblong, obtuse, apex bilobed, keeled dorsally along the mid-nerve. Inflorescence up to 30 cm. long, with up to 15 flowers, the peduncle enveloped in the imbricated floral-bracts; bracts 15–65 mm. long and 10–30 mm. broad when spread out, strongly cucullate, obtuse; flowers variable in size, greenish or the lip purplish. Dorsal sepal 15–25 mm. long and 3.5–6 mm. broad, lanceolate, acute. Lateral sepals 15–25 mm. long and 5–11 mm. broad, lanceolate to ovate-lanceolate, acute, oblique. Petals 14–20 mm. long and 1.5–2.5 mm. broad, linear to linear-oblanceolate, acute. Lip unguiculate; the claw adnate to the column; lamina 12–25 mm. long and 14–28 mm. broad, cordate-reniform, usually retuse or bilobed at the apex, fleshy, provided with a longitudinal callus-thickening, entire or serrulate.

Mexico, Guatemala, Costa Rica, Panama, Venezuela, Ecuador and Peru.

CHIRIQUÍ: Bajo Chorro, Boquete District, alt. 1800 m., *Davidson 245*; province of Chiriquí, alt. 1200 m., *Powell 19, 3394*. COCLÉ: region north of El Valle de Antón, alt. 1000 m., *Allen 2901*.

A variable species that has been much described.

35. EPIDENDRUM CRINIFERUM Reichb. f. in Gard. Chron. 1291. 1871; Hook. f. in Bot. Mag. 100: *t. 6094.* 1874.

Erect, caespitose, epiphytic herbs up to 50 cm. tall. Stems slender, strict, simple, covered with the amplexicaul leaf-sheaths or naked below. Leaves 5–13 cm. long and 0.5–1.5 cm. broad, elliptic-linear to linear-lanceolate, acute, erect or spreading. Inflorescence a simple few-flowered raceme, peduncle covered with several large imbricated spathe-like bracts at the base. Sepals 10–25 mm. long and 2–3 mm. broad, linear-lanceolate to lanceolate, acute or acuminate. Petals 10–20 mm. long and about 1 mm. broad, filiform. Lip unguiculate; claw adnate to the column; lamina strongly 3-lobed, the lateral lobes semi-ovate with crenate or laciniate margins and the setae usually recurved, the mid-lobe 5–12 mm. long and linear or filiform, disc provided with 2 tubercular calluses at the apex of the column.

Costa Rica, Panama and Peru.

COCLÉ: north rim of El Valle de Antón, alt. 600–1000 m., *Allen 1679.*

36. EPIDENDRUM CRYPTANTHUM L. Wms. in Am. Orch. Soc. Bull. 11:249, *t. 7.* 1942.

Repent, branched, epiphytic herbs up to about 40 cm. long. Stems slender, covered with the scarious amplexicaul leaf-sheaths, becoming naked with age, arcuate, continuing the growth from about the middle of the previous year's growth, unilateral in origin, somewhat swollen toward the apex of each growth. Leaves 5.5–8 cm. long and 1.7–3 cm. broad, elliptic to elliptic-ovate, acute, coriaceous, 2–3 at the apex of each growth. Inflorescence about 3 cm. long, a short, congested subcapitate raceme; bracts conspicuous, ovate or ovate-oblong, entire or lacerate toward the apex; flowers small, hidden by the subtending bracts. Dorsal sepal about 10 mm. long and 3 mm. broad, elliptic-oblong, obtuse. Lateral sepals 10–11 mm. long and 3.5–4 mm. broad, elliptic-oblong or elliptic-oval, obtuse or acutish, arcuate. Petals about 10 mm. long and 3.5–4 mm. broad, oblanceolate-oblong, obtuse. Lip short-unguiculate; lamina about 10 mm. long and 8 mm. broad, obovate, cordate at the base, the apex apiculate, lateral margins involute; disc fleshy.

Panama.

COCLÉ: hills north of El Valle de Antón, alt. 800–1000 m., *Allen 2262.*

37. EPIDENDRUM DENTIFERUM Ames & Schweinf. Sched. Orch. 8:42. 1925.

Epidendrum platychilum Schltr. in Fedde Rep. Sp. Nov. Beih. 19:42. 1923, non Schltr. 1921.

Small, repent, epiphytic herbs up to about 10 cm. long. Stems slender, simple or branched, covered with the scarious leaf-sheaths or becoming naked. Leaves 2–7 cm. long and 0.3–0.5 cm. broad, linear or ligulate. Inflorescence terminal, few-flowered; flowers relatively large for the plant. Dorsal sepal 8–15 mm. long

Fig. 127. *Epidendrum cryptanthum*

and 2–2.5 mm. broad, lanceolate, acute. Lateral sepals 9–16 mm. long and 2.5–3.5 mm. broad, lanceolate, acuminate, arcuate. Petals 8–15 mm. long, filiform or subulate. Lip simple, unguiculate; claw adnate to the column; lamina 7–13 mm. long and 8–14 mm. broad, suborbicular or suborbicular-reniform, mucronate, provided with 2 small basal calluses.

Costa Rica and Panama.

DARIÉN: Cana Cuasi trail, Chepigana District, alt. 2400 m., *Terry & Terry 1412.*

38. EPIDENDRUM DENTILOBUM, Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 3:69. 1935.

Erect, caespitose, epiphytic herbs up to about 30 cm. tall. Stems slender, simple, covered with the scarious leaf-sheaths or naked below. Leaves 6–10 cm. long and 1.2–1.8 cm. broad, elliptic, acute. Inflorescence simple or branched, few-flowered; flowers inadequately known. Dorsal sepal about 12 mm. long and 5 mm. broad, concave, narrowly oval. Lateral sepals about 10 mm. long and 6 mm. broad, oblong-oval, oblique, acute. Petals about 11 mm. long and 5.5 mm. broad, spatulate-oblanceolate, oblique, obtuse. Lip unguiculate; claw short, adnate to the column; lamina 3-lobed, about 7 mm. long and 8 mm. broad; lateral lobes small, dentiform, narrowly triangular-lanceolate, explanate, about 1.5–2 mm. long; terminal lobe largest, semicircular-flabellate, cuneate to the base; disc with 3 thickened, carinate nerves, the central one most prominent and with a mammillate callus at the base.

Panama.

CANAL ZONE: hills back of San Juan, alt. sea-level, *Powell 342.*

The available material of this species is inadequate.

39. EPIDENDRUM DIFFORME Jacq. Enum. Pl. Carib. 20. 1760; Select. Stirp. Am. 223, *t. 136.* 1763.

Epidendrum umbellatum Sw. Nov. Gen. & Sp. Prodr. 121. 1788.
Epidendrum latilabrum Lindl. in Bot. Reg. 27: Misc. p. 77. 1841.
Epidendrum chlorocorymbos Schltr. in Fedde Rep. Sp. Nov. Beih. 17:30. 1922.
Epidendrum curvicolumna Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 3:67. 1935.

Caespitose or repent, epiphytic herbs up to 50 cm. tall. Stems fractiflex to straight, covered with the pergameneous, amplexicaul, occasionally infundibuliform leaf-sheaths. Inflorescence a short, few- to many-flowered, subumbellate raceme; flowers greenish or yellowish, long-pedunculate. Leaves 2–12 cm. long and 0.5–3.5 cm. broad, variable, from linear-oblong to elliptic-oval, obtuse. Dorsal sepals 14–35 mm. long and 2–4 mm. broad, linear-elliptic to lanceolate or oblanceolate, acute. Lateral sepals 12–35 mm. long and 3–6 mm. broad, elliptic to oblanceolate, acute, oblique. Petals 7–30 mm. long and 1–5 mm. broad, filiform to linear to oblanceolate, acute. Lip 7–18 mm. long and 12–30 mm. broad, unguiculate; claw adnate to the column; lamina transverse, reniform, broader than long, obscurely to prominently 3-lobed; mid-lobe usually bifid and longer

Fig. 128. *Epidendrum difforme*

than the lateral lobes.

From Florida and Mexico through Central America and the West Indies to Brazil and Peru.

CHIRIQUÍ: Bajo Chorro, alt. 1800 m., *Davidson 182;* Volcán de Chiriquí, alt. 2100 m., *Davidson 885;* David, alt. 30–80 m., *Pittier 2845;* Lino Hill, alt. 1200–1500 m., *Powell 296;* Monte Lirio, alt. 1300–1900 m., *Seibert 211.* COCLÉ: hills north of El Valle de Antón, alt. 800–1000 m., *Allen 2287, 2293;* Valle Chiquito, alt. 700–800 m., *Seibert 514;* San Juan, Chorrera, Paja and Frijoles, *Powell 82, 249, 304, 3259, 3292, 3293, 3294, 3389.*

A variable and widely distributed species which may include *E. Barbeyanum* Kränzl., a species reported from Panama by garden specimen. The two following varieties are hardly distinct.

39a. EPIDENDRUM DIFFORME Jacq. var. FIRMUM (Reichb. f.) Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 2:55. 1934.

Epidendrum firmum Reichb. f. Beitr. Orch. Centr.-Am. 87. 1866.
Epidendrum majale Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:406. 1918.

Distinguished from the species in having the mid-lobe of the lip "at most little broader than long, subquadrate."

Guatemala, Costa Rica and Panama.

CHIRIQUÍ: Finca Lérida to Peña Blanca, alt. 1750–2000 m., *Woodson & Schery 298.*

39b. EPIDENDRUM DIFFORME Jacq. var. SIMULACRUM (Ames) Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 2:57. 1934.

Epidendrum simulacrum Ames, Sched. Orch. 6:75. 1923.

A small-flowered variant of the species, said to be distinguished from "small-flowered specimens of the typical form of the species in having the mid-lobe of the lip a little broader than long."

Panama.

CHIRIQUÍ: Lino Hill, alt. 1200–1500 m., *Powell 298.*

40. EPIDENDRUM EBURNEUM Reichb. f. in Gard. Chron. 404. 1867; Hook. f. in Bot. Mag. 93: *t. 5643.* 1867.

Epidendrum leucocardium Schltr. in Fedde Rep. Sp. Nov. 12:206. 1913.

Slender, caespitose, epiphytic herbs up to about 50 cm. tall. Stems strict, covered with amplexicaul leaf-sheaths, becoming naked below. Leaves 3–14 cm. long and 0.8–2.5 cm. broad, elliptic to lanceolate, obtuse or acute. Inflorescence short, usually exceeded by the leaves, rachis strongly fractiflex; flowers rather large, white. Dorsal sepal 22–36 mm. long and 2.5–4 mm. broad, linear-lanceolate, acute or acuminate. Lateral sepals 22–36 mm. long and 3–4 mm. broad, linear-lanceolate, acute or acuminate, slightly oblique. Petals 20–35 mm. long and 1–2 mm. broad, filiform. Lip with claw adnate to the column; lamina 20–30 mm. long and 22–28 mm. broad, orbicular-cordate to subquadrate or transversely orbicular-oblong, usually apiculate, entire or rarely lobed (one flower seen with

distinct sinuses); disc with 2 mammillate calluses at the base near the apex of the column.

Panama, near sea-level.

BOCAS DEL TORO: vicinity of Chiriquí Lagoon, *Wedel 850, 1625, 2556, 2766.* CANAL ZONE: Gatún Lake, near Colón, *Powell 38, 132, 3462;* "a few miles from Colón in swamps," *Henderson.* COLÓN: Río Indio de Fató, *Pittier 4266.*

41. EPIDENDRUM ELLIPSOPHYLLUM L. Wms. in Ann. Missouri Bot. Gard. 28:419, *t. 22, figs. 1–2.* 1941.

Erect epiphytic herbs up to about 25 cm. tall. Stems slightly fusiform and indurated, with only the annual leaves persisting and the sheaths of the older leaves becoming scarious and disintegrating. Leaves 11–12 cm. long and 2–2.8 cm. broad, elliptic, short-acuminate, usually only 2 or 3 persisting. Peduncles up to about 4 cm. long, ancipitous, generally covered with imbricated bracts. Inflorescence short, 1-, or at most few-,flowered; bracts up to about 2 cm. long, cucullate, lanceolate-triangular, acute; flowers green, segments stiff and coriaceous. Sepals 10–12 mm. long and 3–4 mm. broad, elliptic to oblanceolate, obtuse, 5-nerved. Petals about 10–11 mm. long and 3–4 mm. broad, oblanceolate, obtuse, with 3 principal nerves. Lip unguiculate, the claw mostly adnate to the column; lamina 5–6 mm. long and 5–6 mm. broad, orbicular-ovate in outline, 3-lobed, the lateral lobes small and situated toward the base of the lip, with a 2-ridged lamellate callus plate at the junction of the claw and the lamina. Column slender, about 8 mm. long; clinandrium entire and obtuse; pollinia not seen.

Panama.

COCLÉ: hills north of El Valle de Antón, alt. 1000 m., *Allen 2178, 2706.*

This species is illustrated in fig. 123.

42. EPIDENDRUM ENDRESII Reichb. f. in Gard. Chron. n. s. 19:432. 1883; Hook. f. in Bot. Mag. 128: *t. 7855.* 1902.

Epidendrum Adolphi Schltr. in Fedde Rep. Sp. Nov. 3:108. 1906.

Caespitose or repent, epiphytic herbs up to about 30 cm. long. Stems slender, simple or branched; the amplexicaul leaf-sheaths verrucose and tuberculate. Leaves 1–4.5 cm. long and 0.5–1.5 cm. broad, ovate to oblong-lanceolate, obtuse, coriaceous. Inflorescence a simple, few-flowered raceme; flowers white tinged with purple. Dorsal sepal 8–10 mm. long and 3–5 mm. broad, elliptic to oval, acute. Lateral sepals 9–11 mm. long and 3.5–4.5 mm. broad, ovate-oblong, acute. Petals 8–11 mm. long and 2.5–5 mm. broad, oblanceolate-spatulate to obovate-spatulate, obtuse, slightly oblique. Lip unguiculate; claw adnate to the column; lamina 7–12 mm. long and 6–10 mm. broad, 3-lobed; lateral lobes 2–4 mm. long, explanate, subtriangular, obtuse or acute; mid-lobe bifid with the lobules spreading; disc provided with 2 submammillate calluses under the apex of the column.

Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, Boquete District, alt. 1800 m., *Davidson 323.*

43. EPIDENDRUM EQUITANTIFOLIUM Ames, Sched. Orch. 4:39. 1923.

Epidendrum equitans Lindl. in Bot. Reg. 24: Misc. p. 44. 1838, non Forst. f. nec Ruiz & Pavon.

Erect or pendent, caespitose, epiphytic herbs up to about 4 dm. long. Stems slender, leafy, ancipitous. Leaves 8–27 cm. long and 0.4–1.2 cm. broad, equitant, ancipitous, linear-lanceolate, acute or acuminate, fleshy. Inflorescence borne on an ancipitous, winged peduncle up to 25 cm. long and simulating a leaf, 1- to few-flowered, subcapitate, subtended by a reduced leaf-like bract. Flowers small, dull-colored. Sepals 12–17 mm. long and 1.5–2.5 mm. broad, linear to linear-oblong or elliptic, acute or obtuse. Petals 8–13 mm. long and 1–2 mm. broad, linear-oblanceolate to linear-elliptic. Lip unguiculate; the claw adnate to the column for about half its length; lamina 7–9 mm. long and 5–6 mm. broad, 3-lobed, provided with a callus on the claw at the base; lateral lobes semi-orbicular; terminal lobe lanceolate to triangular-lanceolate; disc concave or cochleate.

Mexico, British Honduras, Honduras and Panama.

CANAL ZONE: hills east of Panamá City, *Powell 206, 3409.* CHIRIQUÍ: "Province of Chiriquí", alt. 900–1050 m., *Powell 206.*

44. EPIDENDRUM EXASPERATUM Reichb. f. Beitr. Orch. Centr.-Am. 87. 1866.

Epidendrum chondranthum Kränzl. in Vierteljahrschr. Naturforsch. Ges. Zürich 74:136. 1929.

Erect, caespitose, epiphytic herbs up to about 3 dm. tall, normally less. Stems slender to thickened, simple or branched, covered with amplexicaul leaf-sheaths, becoming naked with age. Leaves 4–13 cm. long and 0.5–4.5 cm. broad, elliptic to lanceolate to lanceolate-oblong, obtuse or acute, those on branches smallest and narrowest. Inflorescences either terminal or lateral or both, the lateral ones originating opposite the base of a leaf, simple or paniculate. Flowers greenish or whitish and mottled with red or purple. Dorsal sepal 8–14 mm. long and 3–6 mm. broad, oblong-lanceolate, obtuse or acute, cucullate, fleshy, verrucose to mammillate dorsally, the mid-nerve prolonged into a subterminal apicule. Lateral sepals similar but elliptic-oblong and usually oblique. Petals 8–11 mm. long and 2–4 mm. broad, oblanceolate, obtuse. Lip unguiculate, the claw adnate to the column, fleshy or callus-thickened; lamina 7–13 mm. long and about as broad, prominently 3-lobed; lateral lobes spreading, originating about opposite the apex of the column, oblong, oblique, obtuse, 3–5 mm. long, rarely lobulate or dentate; mid-lobe bilobulate, emarginate, the lobules divergent to explanate, rarely dentate, obtuse; disc usually provided with a low callus-thickening which extends from the claw to the isthmus between the lateral lobes and usually is terminated by two mammillate processes, rarely continuous from base to apex,—often obscurely verrucose. Column provided with 2 thin stelidia at the apex over the anther.

Costa Rica and Panama.

CHIRIQUÍ: south slope of Volcán de Chiriquí, Boquete District, alt. 2900 m., *Terry & Terry 1343*; trail from Potrero Muleta to Finca Lérida, *Woodson & Schery 475*.

45. EPIDENDRUM HUNTERIANUM Schltr. in Fedde Rep. Sp. Nov. Beih. 17:33. 1922.

Pendent or erect epiphytic herbs up to about 30 cm. long. Stems simple, somewhat compressed, densely leaved. Leaves to 7.5 cm. long and 4 cm. broad, oblong or broadly oblong, obtuse, unequally bilobed. Inflorescence short, terminal, 4- to 6-flowered, subumbellate; bracts ovate, obtuse to acuminate. Sepals about 1.5 cm. long, oblong-ligulate, subacute, the laterals oblique. Petals about as long as the sepals but narrower, lanceolate-ligulate, subacute, narrowed at the base. Lip unguiculate, the claw adnate to the column; lamina about 11 mm. long and about 10 mm. broad, suborbicular-cordate, very obtuse, base with 2 oblique calluses, median nerves thickened.

Panama.

CANAL ZONE: Im Überschwemmungsgebiete des Gatun-Sees, *Powell 29*.

No specimens were seen of this species. Description taken from the original.

46. EPIDENDRUM IBAGUENSE HBK. Nov. Gen. & Sp. Pl. 1:352. 1816; C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 11:229. 1944.

Epidendrum radicans Pavon ex Lindl. Gen. & Sp. Orch. Pl. 104. 1831; Ames, Hub. & Schweinf. Genus Epidendrum in U. S. & Mid. Am. 162. 1936.

Epidendrum radicans Pavon var. *chiriquense* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:39. 1922.

Variable terrestrial or epiphytic herbs with stems from about 0.1 to 1 m. long, erect, pendent or sprawling. Stems simple or branched, usually slender and leaf-bearing on the newer growths, provided with long whitish roots which originate opposite the bases of some of the leaves, or rarely without these roots. Leaves 1.5–12 cm. long and 0.6–3.5 cm. broad, ligulate to oval or oblong to ovate, obtuse, fleshy, lax or crowded. Inflorescence a lax to short subumbellate or paniculate raceme borne at the apex of a scape which may be up to 1 m. long; scape slender, terete, covered with scarious, appressed bracts or becoming naked, often branched. Flowers variable in size and color, from red to white but most often brick-red. Dorsal sepal 12–22 mm. long and 4–7 mm. broad, elliptic or oblong to narrowly obovate, acute. Lateral sepals similar but slightly oblique. Petals 12–20 mm. long and 5–8 mm. broad, elliptic to obovate, acute. Lip unguiculate, the claw adnate to the column; lamina 7–17 mm. long and as broad, 3-lobed, suborbicular-cordate in outline; the lateral lobes large, rounded, larger than the mid-lobe, the margins entire or usually lacerate; mid-lobe usually oblong in outline, bilobulate with the lobules slighty divergent, entire or usually lacerate, equalling or exceeding the tips of the lateral lobes in length; disc provided with 2 flattened submammillate calluses at the apex of the column and usually with 2 inconspicuous lamellate calluses extending from the apex of the column toward the apex of the lip.

Mexico to Panama, Venezuela, Colombia, Peru and British Guiana.

BOCAS DEL TORO: without locality, *Wedel 12.* CANAL ZONE: Quebrada Ancha, alt. 770 m., *Dodge & Steyermark 17042;* Barro Colorado Island, *Woodworth & Vestal 703, 705.* CHIRIQUÍ: Volcán de Chiriquí, alt. 2450 m., *Davidson 945;* valley of Río Caldera, alt. 1400–1600 m., *Killip 3517;* Chiriquí, alt. 1000–1200 m., *Powell 61, 3503, 3515;* between Concepción and El Volcán, *Peggy White 314;* Chiriquí Viejo Valley, *Gene White 84;* Finca Lérida to Boquete, alt. 1300–1700 m., *Woodson, Allen & Seibert 1098;* vicinity of Boquete, alt. 1200–1500 m., *Woodson & Schery 797.*

A variable species, both in vegetative and floral structure. Where it occurs it is often exceedingly common.

47. EPIDENDRUM IMATOPHYLLUM Lindl. Gen. & Sp. Orch. Pl. 106. 1831; Ames, Sched. Orch. 4:43, *figs.* 1923.

Epidendrum lorifolium Schltr. in Fedde Rep. Sp. Nov. Beih. 17:35. 1922.

Epiphytic (or terrestrial) herbs occasionally up to about 1 m. long. Stems slender, somewhat weak, arising from a rhizome, covered with the pergameneous leaf-sheaths, becoming naked with age. Leaves 6–20 cm. long and 0.6–3 cm. broad, ligulate to ligulate-lanceolate, acute or obtuse, coriaceous. Inflorescence simple or occasionally branched, a more or less compact raceme borne at the apex of a slender peduncle which may be up to 2 dm. long; flowers rose to purple. Dorsal sepal 13–20 mm. long and 3.5–5 mm. broad, elliptic to elliptic-oblanceolate, acute or acuminate. Lateral sepals similar to the dorsal except oblique. Petals 13–18 mm. long and 6–8 mm. broad, elliptic to elliptic-rhomboid, acute. Lip unguiculate; lamina 7–10 mm. long and 5–9 mm. broad, oblong to oblong-obovate in outline, obscurely 3-lobed or lacerate-dentate, especially toward the base; disc with 2 short submammillate calluses at the apex of the column and with a short lamellate callus between them and extending toward the apex of the lip.

Mexico to Panama, Trinidad, Colombia to Peru, the Guianas and Brazil.

CANAL ZONE: Mojinga swamp, *Allen 867.* PANAMÁ: Sabana, *Pittier 3403;* Tapia River, Juan Díaz region, *Maxon & Harvey 6698;* above Peluca Hydrographic Station, *Hunter & Allen 652;* "Panama", *Powell 138.*

This species usually has its roots inhabited by ants. It is said to deteriorate in cultivation if the ants are exterminated.

48. EPIDENDRUM INCOMPTUM Reichb. f. in Bot. Zeit. 10:733. 1852; Ames in Bot. Mus. Leafl. Harv. Univ. 4:64, *t.* 1936.

Erect or scandent epiphytic herbs up to about 70 cm. long. Stems branched or rarely simple, bearing leaves near the apex of the stem, covered with the amplexicaul leaf-sheaths or naked below. Leaves 3–13 cm. long and 1.5–5.5 cm. broad, narrowly oblong to oblanceolate-acute, coriaceous. Inflorescence a few- to several-flowered terminal raceme, about equal to the subtending leaves; flowers greenish. Dorsal sepal 11–15 mm. long and 3.5–5.5 mm. broad, oblanceolate, acute. Lateral sepals 11–15 mm. long and 4.5–6 mm. broad, semilunate, acute. Petals 11–14 mm. long and 1.5–2 mm. broad, narrowly oblanceolate, acute. Lip unguiculate; claw adnate to the column; lamina 7–9 mm. long and 12–17 mm. broad, fleshy,

Fig. 129. *Epidendrum incomptum*

3-lobed, subreniform in outline, lobes about equal, the laterals divaricate and rounded, the mid-lobe subtriangular; disc without calluses.

Mexico, Guatemala, Costa Rica and Panama.

CHIRIQUÍ: "Chiriquí", *Warscewicz.*

No specimens of this species have been found in Panama since the original was collected.

49. EPIDENDRUM ISOMERUM Schltr. in Fedde Rep. Sp. Nov. 2:132. 1906.

Pendent or repent epiphytic herbs up to 1 m., or perhaps more, long. Stems slender, simple or usually branched, flexuose, bearing leaves toward the apex of the new growths, covered with the chartaceous leaf-sheaths, even when old. Leaves 2–12 cm. long and 0.15–0.4 cm. broad, linear, acute, flat or subterete. Inflorescence a single flower borne at the apex of new growths. Flower small, yellowish. Sepals 11–15 mm. long and 2–3 mm. broad, linear-lanceolate, acute, margins revolute. Petals 11–13 mm. long and 1.2–1.5 mm. broad, elliptic-linear, acute. Lip unguiculate, claw adnate to the column; lamina 8–9 mm. long and 2–2.5 mm. broad, narrowly lanceolate, trulliform or canaliculate, fleshy, acute; disc provided with 2 short inconspicuous calluses at the base and with 1 sublamellate median callus extending from the base to about the middle of the lamina.

Mexico, Guatemala, British Honduras, Costa Rica and Panama.

BOCAS DEL TORO: between Finca St. Louis and Konkintoë, alt. 10–15 m., *Woodson, Allen & Seibert 1886.* CANAL ZONE: Río Medio, *Miller 1746.*

50. EPIDENDRUM LOCKHARTIOIDES Schltr. in Fedde Rep. Sp. Nov. Beih. 19:39. 1923; Ames, Sched. Orch. 8:46, *t. 24.* 1925.

Small, densely caespitose, epiphytic herbs up to about 2.5 dm. tall, usually less. Stems covered with the subequitant bases of the leaves. Leaves 1–3.5 cm. long, laterally compressed, approximate, spreading, cultriform, and the sheathing base subequitant, 5–10 mm. broad. Inflorescence composed of several flowers borne in the axils of the upper (sheath-like) leaves; flowers inconspicuous, greenish-yellow or green. Dorsal sepal 6–7 mm. long and about 3 mm. broad, broadly lanceolate, acute, cucullate. Lateral sepals 6–8 mm. long and 2–3 mm. broad, cucullate, arcuate, lanceolate, prominently keeled along the mid-nerve dorsally, the keel usually denticulate. Petals 4–7 mm. long and 0.5–1 mm. broad, linear, obtuse, slightly arcuate. Lip 5–7 mm. long, unguiculate; claw adnate to the column; lamina 4–5 mm. long and as broad, cordate-orbicular to subquadrate, obtuse, often with a short apicule, mid-nerve callus-thickened.

Costa Rica and Panama.

COCLÉ: El Valle de Antón, alt. 600–1000 m., *Allen 1680, 2296.*

51. EPIDENDRUM MICRODENDRON Reichb. f. in Beitr. Orch. Centr.-Am. 84. 1866.

Pendent or repent epiphytic herbs up to about 70 cm. long. Stems slender, branched, covered with the leaf-sheaths or becoming naked. Leaves 1.5–5 cm. long and 0.3–0.9 cm. broad, linear-ligulate to elliptic-oblong, obtuse and with the apex

obscurely and unequally bilobed. Inflorescence a short terminal subfractiflex raceme of 2–8 flowers; bracts 4–7 mm. long, chartaceous, cucullate, acute. Dorsal sepal 7–10 mm. long and 1.5–3 mm. broad, lanceolate, acute. Lateral sepals 6.5–9 mm. long and 2.5–3 mm. broad, lanceolate to ovate-lanceolate, acute, oblique. Petals 5–10 mm. long and 0.7–1.5 mm. broad, linear to elliptic-linear, acute. Lip unguiculate; the claw short, adnate to the column; lamina 5–8 mm. long, and when expanded about as broad, 3-lobed but obscurely so, the lateral lobes erect, rounded, enfolding the short column, mid-lobe lanceolate or narrowly triangular, acute or acuminate, fleshy, and the apex subterete; disc provided with a small cucullate callus under the apex of the column which is entire or tridentate at the apex. Column provided with a horn-like process at its apex.

Costa Rica and Panama.

CHIRIQUÍ: Cuesta de las Palmas, Serra de la Horqueta, alt. 1700–2100 m., *Pittier 3220.*

The specimen from Panama is not typical—perhaps represents a distinct species.

52. EPIDENDRUM MOYOBAMBAE Kränzl. in Fedde Rep. Sp. Nov. 1:185. 1905; C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 11:238. 1944.

Epidendrum subpatens Schltr. in Fedde Rep. Sp. Nov. Beih. 17:40. 1922.
Epidendrum benignum Ames in Sched. Orch. 2:26. 1923.

Pendent or ascending, caespitose, epiphytic herbs up to about 8 dm. long. Stems slender, simple, covered with the leaf-sheaths above, naked at the base. Leaves 6–16 cm. long and 1.5–4 cm. broad, elliptic-lanceolate to elliptic-ovate, acute, coriaceous. Inflorescence a terminal few- to many-flowered pendent raceme up to about 4 dm. long; flowers rather large, greenish to yellowish or whitish. Dorsal sepal 17–25 mm. long and 5–9 mm. broad, oblanceolate, acute or obtuse. Lateral sepals 17–25 mm. long and 5–9 mm. broad, oblanceolate to narrowly obovate, oblique, obtuse. Petals 16–22 mm. long and 3–7 mm. broad, linear-oblanceolate to broadly oblanceolate, obtuse or acute, slightly oblique. Lip unguiculate; the claw adnate to the column; lamina 15–25 mm. long and 20–30 mm. broad, 3-lobed; lateral lobes spreading or deflexed, suborbicular, obtuse, much larger than the mid-lobe; mid-lobe bilobulate, the lobules more or less divaricate, smaller than either lateral lobe; disc provided with 2 small submammillate or mammillate calluses under the apex of the column and with 1 or rarely 3 lamellate calluses extending along or near the median line.

Guatemala, Costa Rica, Panama, Trinidad, Colombia, Peru and Brazil.

CANAL ZONE: Gatún Lake, *Powell 86, 3337, 3558;* Barro Colorado Island, *Shattuck 216.* VERAGUAS: Santiago, alt. 15 m., *Powell 86, 3558.*

Presumably this was originally confused with *Epidendrum patens* Sw. It may prove to be the same. It is a rather showy plant. Powell's numbers for the two localities are the same, and it is possible that all of the material came from one original collection.

Fig. 130. *Epidendrum nocturnum*

53. EPIDENDRUM NOCTURNUM Jacq. Enum. Pl. Carib. 29. 1760; Select. Stirp. Am. 225, *t. 139.* 1763; Ames, Hub. & Schweinf. Genus Epidendrum in U. S. and Mid. Am. 129. 1936.

Epidendrum nocturnum Jacq. var. *panamense* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:36. 1922.

Variable, caespitose or subrepent, epiphytic plants up to 1 m. tall. Stems slender, simple, covered with the scarious leaf-sheaths or becoming naked. Leaves

5–15 cm. long and 0.8–6.5 cm. broad, elliptic, elliptic-oblong, ligulate or oval, acute or obtuse, coriaceous to fleshy. Inflorescence a 1- to few-flowered terminal raceme (1 flower open at a time); rachis when present fractiflex; flowers large, usually white. Sepals similar, 35–90 mm. long and 2–5 mm. broad, from filiform to linear, acute or acuminate. Petals similar to the sepals but smaller, 35–80 mm. long and 1–3 mm. broad. Lip unguiculate, claw adnate to the column; lamina up to 65 mm. long, prominently 3-lobed; lateral lobes subparallel, acute, oblique, lanciform, 10–40 mm. long; mid-lobe subfiliform, 20–40 mm. long.

Florida, Mexico to Panama, the West Indies and tropical South America.

BOCAS DEL TORO: vicinity of Chiriquí Lagoon, *Wedel 1001, 2938.* CANAL ZONE: hills near Panamá City, Gatún Lake, Frijoles, San Juan, Chorrera, Paja, *Powell 35, 216, 217, 3020, 3055, 3073, 3075.* CHIRIQUÍ: "Chiriquí", alt. 1200–1400 m., *Powell 347.* COCLÉ: hills north of El Valle de Antón, alt. 800–1000 m., *Allen 2257.*

Occasional throughout the American tropics, usually found at low elevations but occasionally in the mountains.

54. EPIDENDRUM OBESUM Ames in Sched. Orch. 2:31. 1923.

Coarse, caespitose, epiphytic herbs up to about 6 dm. tall. Stems slender, covered with the loosely amplexicaul complanate leaf-sheaths or reduced leaves. Leaves 5–20 cm. long and 3–7 cm. broad, elliptic-ligulate to oval, obtuse, usually crowded on the stem. Inflorescence a short, few- to several-flowered raceme subtended by a large spathaceous sheath, the flowers long-pedunculate, whitish. Dorsal sepal 35–55 mm. long and 3–7 mm. broad, linear or linear-elliptic, acute. Lateral sepals similar to the dorsal except slightly arcuate. Petals 28–50 mm. long and 1.5–4 mm. broad, linear, acute. Lip unguiculate; the claw adnate to the column; lamina 18–30 mm. long and up to about 15 mm. broad, 3-lobed; the lateral lobes semiorbicular to subquadrate, explanate, obtuse, about 6–8 mm. long and as broad; mid-lobe about 14–25 mm. long, linear-lanceolate to very narrowly triangular, acute; disc provided with 2 fleshy calluses at the base, the apices of which are free and porrect. Pedicellate ovary up to about 12 cm. long.

Nicaragua, Costa Rica and Panama. Possibly also in Ecuador.

CHIRIQUÍ: Bajo Chorro, Boquete District, alt. 1800 m., *Davidson 1288.*

The flowers somewhat resemble those of *Epidendrum nocturnum* Jacq.

55. EPIDENDRUM PANAMENSE Schltr. in Fedde Rep. 12:212. 1913.

Caespitose epiphytic herbs up to about 2 dm. tall. Stems ancipitous, covered with amplexicaul leaf-sheaths, provided with 2–3 leaves toward the apex. Leaves 8–11 cm. long and 1–1.3 cm. broad, elliptic to lanceolate, acuminate. Inflorescence a compact few-flowered distichous raceme terminating a slender ancipitous peduncle. Sepals about 1.2 cm. long, ligulate, apiculate, the laterals oblique. Petals about as long as the sepals, linear. Lip unguiculate; claw adnate to the column; lamina about 5 mm. long and 4 mm. broad, ovate, shortly acuminate, subcordate at the base, provided with 2 calluses at the base which have a short keel between them. *(Description compiled from the original).*

Panama.

PANAMÁ: Cerro de Garagará, Sambú Basin, southern Darién, alt. 550–974 m., *Pittier 5635*.

Allied to *Epidendrum Allenii* L. Wms. and to *E. Lankesteri* Ames.

56. EPIDENDRUM PANICULATUM Ruiz & Pavon, Syst. Veg. 243. 1798; Hook. f. in Bot. Mag. 94: *t. 5731*. 1868; Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 2:67. 1934.

Epidendrum floribundum HBK. Nov. Gen. & Sp. 1:353, *t. 86*. 1816; Hook. in Bot. Mag. 65: *t. 3637*. 1838.
Epidendrum turialvae Reichb. f. in Gard. Chron. 1871:1678. 1871.
Epidendrum resectum Reichb. f. in Linnaea 41:82. 1877.
Epidendrum piliferum Reichb. f. loc. cit. 83.
Epidendrum Isthmi Schltr. in Fedde Rep. Sp. Nov. Beih. 17:34. 1922.
Epidendrum reflexum Ames & Schweinf. in Sched. Orch. 8:49. 1925.

Caespitose epiphytic or saxicolous plants up to about 1.5 dm. tall, often rank in growth. Stems simple, erect or spreading, covered with the amplexicaul leaf-sheaths or naked with age. Leaves 4–25 cm. long and 0.5–7 cm. broad, variable but essentially linear-lanceolate to oval, acute or acuminate, rarely obtuse, coriaceous. Inflorescence from shorter than the subtending leaves to much longer, from a simple few-flowered raceme to a compound multiflorous panicle, terminal, usually subtended with a spathe which may be up to 6 cm. long; bracts on the peduncle from very short to about 7 cm. long; flowers variable in size and color. Dorsal sepal 7–16 mm. long and 2–3.5 mm. broad, elliptic to broadly oblanceolate, acute or obtuse. Lateral sepals 8–16 mm. long and 2.5–4.5 mm. broad, elliptic to broadly lanceolate, acute or obtuse. Petals 8–15 mm. long and 0.2–2 mm. broad, usually filiform or filiform-clavellate but occasionally linear-oblanceolate. Lip unguiculate; claw adnate to the column; lamina 4–10 mm. long and 5–12 mm. broad, from nearly simple to 3- or 4-lobed (commonly 3-lobed); lateral lobes from dolabriform to obliquely triangular-ovate or ovate, outer margin entire to sublacerate; mid-lobe usually strongly bilobulate, but often from truncate to retuse, often apiculate, lobules variable in form and divergence, linear to oblong to triangular or spatulate, margin entire or somewhat lacerate; disc with 2 short sublamellate calluses at the base, often provided with one or more callus ridges parallel to the mid-nerve.

Mexico to Panama and in South America to Argentina.

CANAL ZONE: Quebrada Ancha, *Steyermark & Allen 17109*; hills east of Panamá City, and Río Indio near the mouth of Chagres River, *Powell 104, 323, 3396*. CHIRIQUÍ: El Boquete, alt. 100–1300 m., *Pittier 2973*; "Chiriquí", *Powell 233, 3174*; Río Chiriquí Viejo, alt. 1300–1900 m., *Seibert 145*; Upper Río Chiriquí Viejo, *White 326*. COCLÉ: vicinity of La Mesa, north of El Valle de Antón, alt. 1000 m., *Allen 2389*. PANAMÁ: Río Tapía, *Standley 28137*.

A widespread and variable species. Only the essential synonymy for Panama and adjacent Costa Rica has been given above.

Fig. 131. *Epidendrum pendens*

57. Epidendrum pendens L. Wms. in Ann. Missouri Bot. Gard. 28:421, *t.* 23. 1941.

Pendent epiphytic herbs about 45 cm. long. Leaves 9–15 cm. long and 2–3.5

cm. broad, elliptic to elliptic-lanceolate, coriaceous, distichous, marginate, gray, deciduous; leaf-sheaths loose, completely investing the stem, pergameneous, ancipitous, the abscission line prominent. Inflorescence of 1 or few large terminal flowers subtended by a leaf-like sheath up to 3 cm. long; flowers large for the genus, green. Dorsal sepal about 5 cm. long and 1.2 cm. broad, oblong-oblanceolate, acute, fleshy, with 5–7 main nerves. Lateral sepals 4.3–4.8 cm. long and 1.5 cm. broad, elliptic, acute, fleshy, with about 7 main nerves. Petals about 4.5–5 cm. long and 2 mm. broad, linear, somewhat narrowed to the base, obtuse or acute, fleshy, 1-nerved. Lip with the claw adnate with the column to the apex of the column; lamina about 2.5–3 cm. long and 3 cm. broad, 3-lobed, suborbicular in general outline, with a thickened central nerve and with thickened nerves or ridges radiating from it and covering the remainder of the lip, lateral lobes rounded, about 1.5 cm. long, mid-lobe 1–1.5 cm. long and about 1.5 cm. broad, subquadrate, emarginate. Column 1.5–2 cm. long and 6–8 mm. in diameter at the apex, fleshy.

Panama.

COCLÉ: vicinity of La Mesa, El Valle de Antón, alt. 1000 m., *Allen 2570.*

58. EPIDENDRUM PHYSODES Reichb. f. in Gard. Chron. 289. 1873.

Small repent or caespitose, epiphytic or terrestrial herbs up to about 30 cm. long. Stems simple, slender, densely leaved, prolonged into a long peduncle above. Leaves 1.5–6.5 cm. long and 0.3–0.8 cm. broad, lanceolate, the margins often revolute. Inflorescence a short few-flowered raceme (with 1 flower open at a time?) on the apex of a long peduncle. Dorsal sepal 5–9 mm. long and 2–3 mm. broad, elliptic to oblong-lanceolate, acute. Lateral sepals 5–9 mm. long and 2.3–3.6 mm broad, elliptic-oblong to oblong-ovate, somewhat oblique, acute. Petals 4.5 mm. long and 0.5–0.8 mm. broad, linear to subfiliform. Lip unguiculate; claw adnate to the column; provided with a spur which is 3–4 mm. long, adnate to the ovary for a part of its length or occasionally for all of its length but usually the obtuse and rounded tip free; lamina 3–5 mm. long and 4–6 mm. broad, entire, subreniform or suborbicular, fleshy; disc with 2 mammillate calluses near the apex of the column and often with a longitudinal callus-thickening along the median line.

Guatemala, Costa Rica and Panama.

BOCAS DEL TORO: vicinity of Chiriquí Lagoon, *Wedel 1126.*

This species is atypical in the genus *Epidendrum* in that it is provided with a distinct spur which apparently originates from the lip. If generically distinct it belongs in Lindley's genus *Physinga.* Suitable material for comparative studies is not available.

59. EPIDENDRUM PLATYSTIGMA Reichb. f. in Beitr. Orch. Centr.-Am. 83. 1866.

Epidendrum ramonianum Schltr. in Fedde Rep. Sp. Nov. Beih. 19:217. 1923.
Epidendrum gibbosum L. Wms. in Ann. Missouri Bot. Gard. 28:420, *t. 21, figs. 7–10.* 1941.

Fig. 132. *Epidendrum platystigma*

Simple or branched, repent, terrestrial or epiphytic herbs up to probably more than 5 dm. tall. Stems covered with the very loose leaf-sheaths or becoming naked and vernicose, up to 15 mm. in diameter. Leaves 2–15 cm. long and 0.5–2.5 cm.

broad, linear-lanceolate or linear-oblong to ligulate, obtuse and often unequally bilobulate at the apex, coriaceous, leaves on the sterile or poorly flowered branches largest, on the heavily flowered branches very small; leaf-sheaths usually somewhat inflated and pergameneous, soon disintegrating. Inflorescences short, few-flowered, terminal, the rachis fractiflex; bracts up to 2 cm. long, scarious, cochleate, acute; flowers greenish or whitish, often marked with red. Dorsal sepal 7–12 mm. long and 4–6 mm. broad, elliptic-oblong, acute. Lateral sepals 7–12 mm. long and 3–7 mm. broad, narrowly obovate to oblong-ovate, obtuse or acute, apiculate or winged dorsally along the mid-nerve. Petals 8–10 mm. long and 3–5 mm. broad, oblanceolate to narrowly obovate, obtuse. Lip 6–12 mm. long and 5–10 mm. broad, broadly oblong to suborbicular or cordate, obtuse or shallowly emarginate, fleshy and tumid along the mid-nerve or with several raised nerves, gibbous at the base, provided with an inconspicuous bi- or trilobate callus under the apex of the column.

Costa Rica and Panama.

CHIRIQUÍ: Volcán de Chiriquí, alt. 2600 m., *Davidson 971;* Casita Alta to Serra Copete, alt. 2300–3300 m., *Woodson & Schery 367.*

60. EPIDENDRUM POLYANTHUM Lindl. Gen. & Sp. Orch. Pl. 106. 1831; Batem. Orch. Mex. & Guat. *t. 34.* 1842.

Epidendrum pergameneum Reichb. f. Beitr. Orch. Centr.-Am. 86. 1866
Epidendrum quinquelobum Schltr. in Fedde Rep. Sp. Nov. Beih. 19:125. 1923.

Caespitose epiphytic herbs, often rank-growing, up to about 1.5 m. tall. Stems erect or ascending, simple, leafy above. Leaves 5–25 cm. long and 0.8–5 cm. broad, from linear to oval or ovate, acute or acuminate, variable. Inflorescence terminal or lateral (i. e. flowers or racemes borne from below a leaf) or both, usually consisting of racemes borne laterally on an elongated peduncle, rarely the racemes branching and becoming paniculate, rarely consisting of a single short terminal raceme; flowers extremely variable in size and coloration. Dorsal sepal 6.5–13 mm. long and 2.5–3.5 mm. broad, oblanceolate, obtuse, papillose externally. Lateral sepals 6.5–16 mm. long and 2.5–5 mm. broad, oblanceolate, obtuse, oblique, papillose externally. Petals 5–12 mm. long and about 0.5 mm. broad, filiform or subfiliform. Lip unguiculate; claw adnate to the column; lamina 4–7 mm. long and 4–7 mm. broad, usually broader than long, 3-lobed or rarely almost entire; the lateral lobes oblong to flabellate, entire or usually undulate, dentate or lacerate; mid-lobe from subquadrate to oblong, retuse or bilobulate, the lobules sometimes explanate; disc provided with 2 mammillate calluses near the apex of the column and with one or more callus-thickened ridges along the median line. Ovary and pedicel usually papillose.

Guatemala, Honduras, Nicaragua, Costa Rica and Panama. Venezuela and Brazil.

CHIRIQUÍ: Bajo Chorro, alt. 1400 m., *Davidson 457.*

A polymorphic species which, however, is usually easy to recognize.

60a. EPIDENDRUM POLYANTHUM Lindl. var. MYODES (Reichb. f.) Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 3:75. 1935.

Epidendrum myodes Reichb. f. Beitr. Orch. Centr.-Am. 86. 1866.

Similar to the species except the lateral sepals are said to be only 4–6.5 mm. long (6.5–16 mm. long in the species).

Honduras, Costa Rica and Panama.

CHIRIQUÍ: "Chiriquí", alt. 1200 m., *Powell 188, 242, 3398, 3452, 3464, 3472, 3505.*

61. EPIDENDRUM PORPAX Reichb. f. in Bonplandia 3:220. 1855.

Epidendrum porphyrophyllum Schltr. in Fedde Rep. Sp. Nov. Beih. 17:37. 1922.

Small, caespitose, epiphytic herbs up to about 8 cm. tall. Stems short, covered with the scarious amplexicaul sheaths of the leaves. Leaves 7–25 mm. long and 2–7 mm. broad, ligulate to lanceolate or oblong-lanceolate, obtuse or acute, fleshy, spreading. Inflorescence consisting of a single flower from the apex of the stem, subtended by a scarious sheath; flowers large for the plant, sepals and petals greenish, lip purple. Dorsal sepal 7–14 mm. long and 2–5 mm. broad, lanceolate to lanceolate-ovate, acute. Lateral sepals 8–14 mm. long and 3–5.5 mm. broad, lanceolate to lanceolate-ovate, acute, adnate at the base to the claw of the lip and to the column for about the length of the column. Petals 7–13 mm. long and 0.5–1.5 mm. broad, linear, obtuse, obscurely ciliolate toward the apex. Lip up to 18 mm. long, unguiculate; claw narrow, adnate to the column; lamina 9–15 mm. long and as broad, suborbicular-cordate, obscurely ciliolate, fleshy, provided with 2 mammillate calluses at the base under the apex of the column.

Mexico, Guatemala, Honduras, Costa Rica, Panama and Venezuela.

CANAL ZONE: foothills east of Panamá City, *Powell 183*. CHIRIQUÍ: "Province of Chiriquí", alt. 1200 m., *Powell 4000*.

62. EPIDENDRUM POWELLII Schltr. in Fedde Rep. Sp. Nov. Beih. 17:38. 1922.

Caespitose epiphytic herbs up to about 30 cm. tall. Stems simple, somewhat flexuose, covered with leaf-sheaths and ancipitous. Leaves 3.5–16 cm. long and 0.35–1.2 cm. broad, elliptic-linear, acute. Inflorescence up to about 7 cm. long, a terminal, densely flowered raceme subtended by one or more spathaceous bracts. Flowers small, whitish with pink or orange markings. Dorsal sepal 2.5–3.5 mm. long and 1–1.2 mm. broad, narrowly lanceolate to oblong-oval, acute. Lateral sepals 3–4 mm. long and 1.5–2 mm. broad, oblong-oval to ovate, oblique, acute. Petals 2–3 mm. long and 0.3–0.4 mm. broad, linear, acute. Lip unguiculate; claw adnate to the column; lamina 1.5–3 mm. long and about as broad, 3-lobed; the lateral lobes dolabriform to semiorbicular, entire or crenate or lobulate; mid-lobe ligulate to subtriangular, acute; disc with 2 small calluses at the base.

Panama.

CHIRIQUÍ: "Chiriquí", alt. 1200 m., *Powell 228, 3445, 3456*. COCLÉ: hills south of El Valle de Antón, alt. 600–800 m., *Allen 2797*.

63. EPIDENDRUM PROBIFLORUM Schltr. in Fedde Rep. Sp. Nov. Beih. 17:39. 1922.

Small, caespitose, epiphytic herbs up to about 15 cm. tall. Stems slender, short, produced into a long peduncle above, bearing 2–3 leaves. Leaves 3–5 cm. long and 0.6–1.2 cm. broad, linear-lanceolate to lanceolate, acute. Inflorescence a few-flowered raceme at the apex of the peduncle; flowers small, purple-brown with a white lip. Dorsal sepal about 5 mm. long and 1.5 mm. broad, lanceolate, acute. Lateral sepals about 4.5 mm. long and 2 mm. broad, ovate-lanceolate, slightly oblique, acute. Petals about 4 mm. long and 1 mm. broad, elliptic, obscurely serrulate, acute. Lip unguiculate; claw adnate to the column; lamina about 3 mm. long and 4 mm. broad, entire, reniform-cordate, acute, fleshy; disc provided with a single sublamellate callus near the middle.

Panama.

CHIRIQUÍ: "Chiriquí", *Powell 250.*

Known to us only by the inadequate specimen cited.

64. EPIDENDRUM PSEUDEPIDENDRUM Reichb. f. Xenia Orch. 1:160, *t. 53.* 1856; Hook. f. in Bot. Mag. 97: *t. 5929.* 1871.

Pseudepidendrum spectabile Reichb. f. in Bot. Zeit. 10:733. 1852, not Focke nor Reichb. f.

Caespitose epiphytic herbs up to about 1 m. tall. Stems slender, simple, leafy above, naked below. Leaves 6–20 cm. long and 1.5–4.5 cm. broad, oblanceolate, acute, coriaceous. Inflorescence 1 or more, 1- to 3-flowered terminal racemes borne on a more or less elongated peduncle, the peduncle covered at the base with several imbricated bracts; flowers relatively large, sepals and petals greenish, lip orange. Dorsal sepal 26–30 mm. long and 3–5 mm. broad, oblanceolate, acute. Lateral sepals 22–32 mm. long and 5–7 mm. broad, oblanceolate, acute, sometimes obtuse. Petals 22–30 mm. long and 2–3 mm. broad, linear-oblanceolate, obtuse. Lip unguiculate; the long claw adnate to the column; lamina 13–17 mm. long and 15–22 mm. broad, retuse, transversely oblong or subquadrate to suborbicular-flabellate, entire (or obscurely 3-lobed), crenulate, dentate or lacerate; disc provided with 2 short lamellate calluses at the apex of the column and a longitudinal 1- to 5-ridged callus-thickening along the median line, from base to apex.

Costa Rica and Panama.

CHIRIQUÍ: "auf Ficus-Bäumen der Cordilleren von Chiriquí", alt. 1200 m., *Warscewicz.*

Apparently one of the prettier Epidendrums occurring in Panama.

65. EPIDENDRUM PUDICUM Ames, Sched. Orch. 6:71, *fig. 10.* 1923.

Small, caespitose, epiphytic herbs up to about 20 cm. tall. Stems slender, obscurely fractiflex, covered with the persistent, pergameneous, amplexicaul leaf-sheaths. Leaves 15–30 mm. long and 1–3 mm. broad, linear, obtuse, fleshy. Inflorescence a 1- to few-flowered subumbel. Dorsal sepal 8–10 mm. long and 1.5–2.5 mm. broad, linear-oblanceolate, acute. Lateral sepals similar to the dorsal but slightly arcuate. Petals about 8 mm. long and nearly 1 mm. broad near the apex. Lip unguiculate; claw adnate to the column; lamina about 5 mm. long and

7 mm. broad, subtriangular-cordate to reniform, obscurely 3-lobed, acute, provided with 2 slightly divergent submammillate calluses at the base.

Panama.

CHIRIQUÍ: Palo Alto, alt. 1360 m., *Powell 319, 3412.*

Closely allied to *Epidendrum difforme* Jacq.

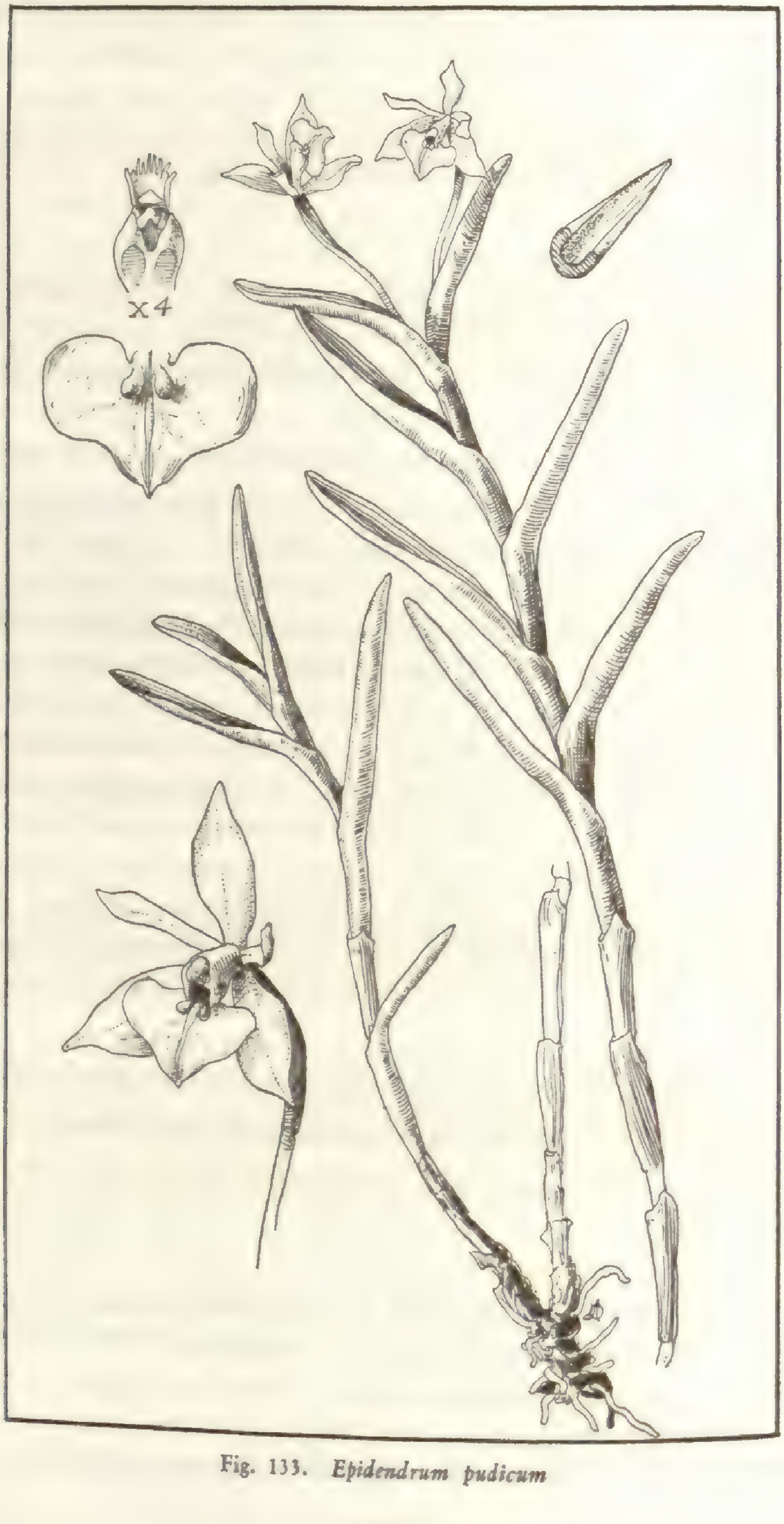


Fig. 133. *Epidendrum pudicum*

66. EPIDENDRUM RAMOSUM Jacq. Enum. Pl. Carib. 29. 1760; Select. Stirp. Am. 221, *t. 132.* 1763; Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 2:45. 1934.

Epidendrum flexicaule Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:403. 1918.
Epidendrum modestiflorum Schltr. in Fedde Rep. Sp. Nov. Beih. 19:213. 1923.

Erect or scandent epiphytic herbs, perhaps up to a meter or more long. Stems slender, simple or branched, covered with the leaf-sheaths, becoming naked with age. Leaves 1–12 cm. long and 0.2–1.5 cm. broad, linear to lanceolate to oblong-elliptic, obtuse and the apex usually unequally bilobed. Inflorescence short and few- to several-flowered from a fractiflex raceme; bracts scarious, conspicuous; flowers small, variable in size. Sepals 4.5–13 mm. long and 1.5–3 mm. broad, linear-lanceolate to elliptic-oblong, occasionally carinate dorsally. Petals 4.5–13 mm. long and 0.8–2.3 mm. broad, linear to linear-spatulate, acute or obtuse. Lip unguiculate; claw adnate to the column; lamina 4–9 mm. long and 2–5 mm. broad, simple or subtrilobate, triangular-cordate to lanceolate-cordate, acute or obtuse, provided with a longitudinal callus which is bifurcate at the base.

Mexico to Panama, the West Indies and in South America to Brazil and Peru.

CHIRIQUÍ: Lino Hill, alt. 1550 m., *Powell 322.* COCLÉ: El Valle de Antón, alt. 600–1000 m., *Allen 1244, 2827, 2836.*

66a. EPIDENDRUM RAMOSUM Jacq. var. ANGUSTIFOLIUM (Cogn.) L. Wms. in Ann. Missouri Bot. Gard. 28:422. 1941.

Epidendrum imbricatum Lindl. var. *angustifolium* Cogn. in Mart. Fl. Bras. 3^5:171. 1898, as var. *angustifolia.*
Epidendrum imbricatum Lindl. Gen. & Sp. Orch. Pl. 110. 1831, non Lam.
Epidendrum biflorum Cogn. in Bull. Herb. Boiss. II, 2:337, *figs. 1–3.* 1902, non Forst. f. nec R. & P.
Epidendrum Boissierianum Schltr. in Beih. Bot. Centralbl, 36, Abt. 2:459. 1918.
Epidendrum santaclarense Ames, Sched. Orch. 4:49. 1923.
Epidendrum ramosum Jacq. var. *imbricatum* Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 2:47. 1934.

Intergrades with the species but usually varies in having thicker stems, fine maculations on the leaf-sheaths and bracts, the bracts more tightly imbricated and conduplicate; leaves usually broader and larger.

Guatemala, Costa Rica, Panama, the West Indies, Brazil.

BOCAS DEL TORO: Río Cricamola, between Finca St. Louis and Konkintoë, alt. 10–15 m., *Woodson, Allen & Seibert 1898.*

67. EPIDENDRUM REPENS Cogn. in Fedde Rep. Sp. Nov. 7:122. 1909.

Small, repent or pendent, epiphytic herbs up to about 5 dm. long. Stems slender, much branched, leafy, covered with the persistent leaf-sheaths, slightly ancipitous, often flexuose. Leaves 6–25 mm. long and 2–6 mm. broad, linear-oblong to oblong to ovate, obtuse, coriaceous, usually obtuse and obscurely and unequally bilobed at the apex. Inflorescence a single flower borne terminally on the stem, subtended by one or more short scarious bracts; flowers small, inconspicuous, maroon. Dorsal sepal 7–8 mm. long and about 2 mm. broad, elliptic-oblong or

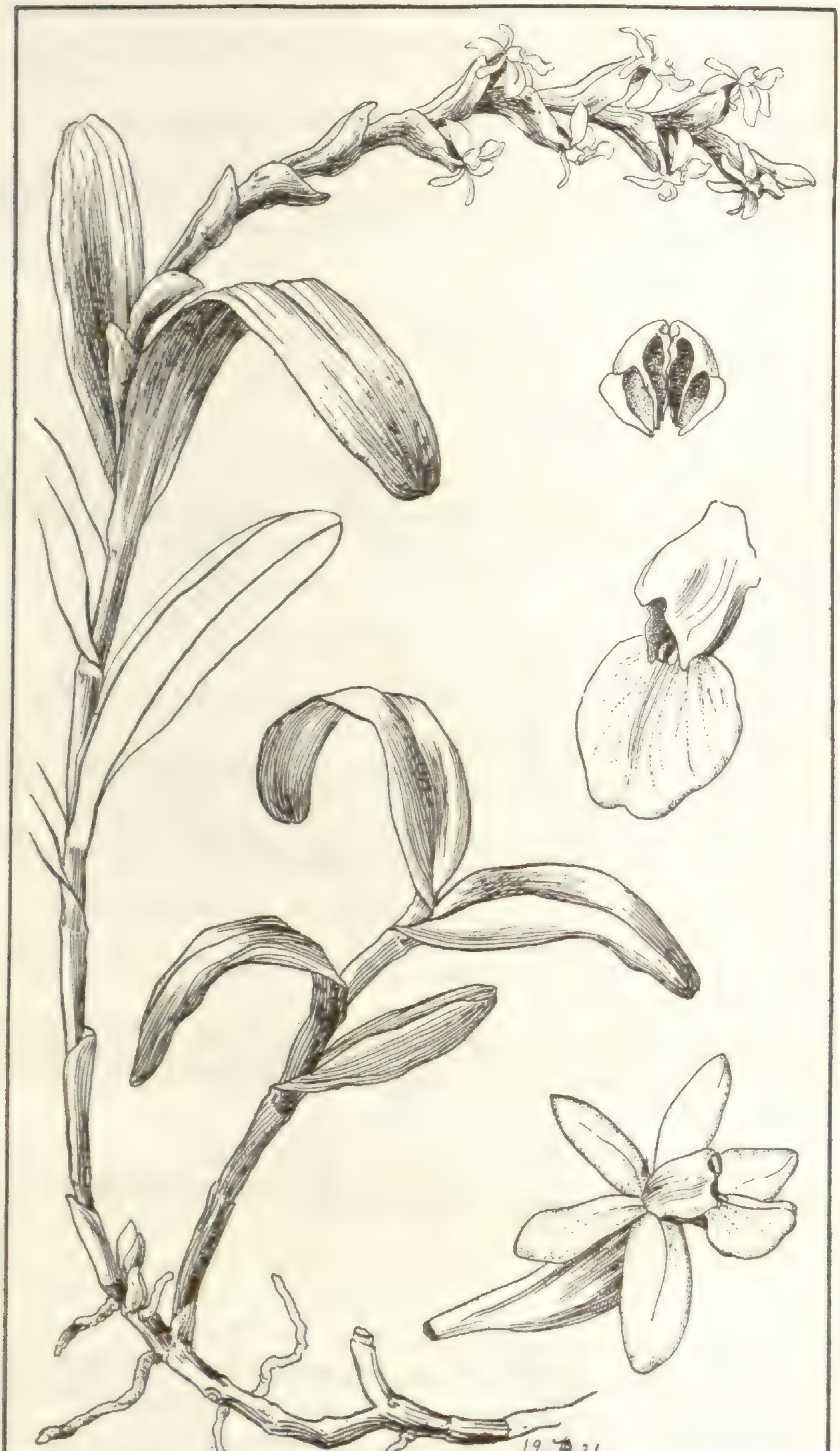


Fig. 134. *Epidendrum rigidum*

lanceolate, acute. Lateral sepals 7–8 mm. long and 1.8–3 mm. broad, elliptic-oblong to lanceolate-ovate, acute. Petals 6–7 mm. long and 0.7–1.5 mm. broad, linear, acute. Lip unguiculate; claw adnate to the column; lamina about 4 mm. long and as broad, triangular-cordate to cordate, simple, fleshy, ecallose or provided with a short, fleshy, lamellate callus toward the apex.

Mexico, Guatemala, Costa Rica, Panama, the West Indies and Venezuela.

CHIRIQUÍ: vicinity of Cerro Punta, alt. 2000 m., *Allen 1530.*

68. EPIDENDRUM RIGIDUM Jacq. Enum. Pl. Carib. 29. 1760; Select. Stirp. Am. 222, *t. 134.* 1763.

Epidendrum cardiophorum Schltr. in Fedde Rep. Sp. Nov. 9:214. 1911.
Spathiger rigidus Small, Fl. Miami, p. 55. 1913.

Repent epiphytic herbs up to about 35 cm. long. Stems slender, simple, covered with the amplexicaul leaf-sheaths, sometimes appearing ancipitous. Leaves 3–13 cm. long and 0.4–2 cm. broad, linear to lanceolate-oblong or oblong, obtuse, coriaceous, the apex usually unequally bilobed. Inflorescence a strict raceme up to about 15 cm. long, few- to several-flowered; bracts up to about 15 mm. long, ovate, acute or obtuse, semi-equitant or usually the base surrounding the peduncle, usually with a median keel which is decurrent onto the peduncle; flowers usually greenish. Dorsal sepal 5.5–9 mm. long and 2–3 mm. broad, oblong to lanceolate-ovate, obtuse. Lateral sepals 5–9 mm. long and 2–4 mm. broad, ovate-lanceolate to obovate, oblique, obtuse. Petals 5–9 mm. long and 1.2–2 mm. broad, ovate-lanceolate to obovate, oblique, obtuse. Lip unguiculate; claw adnate to the column; lamina 4–6 mm. long and about as broad, cordate-orbicular, obtuse or obscurely retuse, lateral margins revolute; disc fleshy, with 2 mammillate calluses at the apex of the column.

Florida, Mexico to Panama, the West Indies, tropical and subtropical South America.

CANAL ZONE: near Salamanca Hydrographic Station, Río Pequení, *Dodge, Steyermark & Allen s. n.;* between Tumba Vieja and Salamanca, *Steyermark & Allen 16749.*

A widespread species which is surprisingly constant in characters.

68a. EPIDENDRUM RIGIDUM Jacq. var. **angustisegmentum** L. Wms. var. nov.[1]

Vegetatively similar to the species. Dorsal sepal 9–10 mm. long and 2–3 mm. broad, lanceolate, acute. Lateral sepals 9–10 mm. long and 2.5–3.5 mm. broad, lanceolate, oblique, acute. Petals 7.5–9 mm. long and 0.5–1 mm. broad, subfiliform to linear, acute. Lip unguiculate; claw adnate to the column; lamina 5–6 mm. long and 3–3.5 mm. broad, oblong-ovate, obtuse, truncate at the base, fleshy; disc with two mammillate calluses at the apex of the column and with one or more inconspicuous callus ridges.

[1] Sepalum dorsale lanceolatum, acutum. Sepala lateralia lanceolata, obliqua, acuta. Petala subfiliformia vel linearia, acuta. Lamina labelli oblongo-ovata, obtusa, basi truncata, carnosa; discus prope basim bicallosus.

Panama.

BOCAS DEL TORO: epiphyte, Nances Cay Island, *Wedel 586;* Water Valley, *Wedel 851;* Water Valley, vicinity of Chiriquí Lagoon, *Wedel 1708* (TYPE Herb. Ames).

The variety differs from the species in its narrower floral segments and differently shaped lip.

69. EPIDENDRUM SANCHOII Ames, Sched. Orch. 4:48. 1923; loc. cit. 10:70. 1930.

Repent epiphytic herbs up to about 4 dm. long. Stems small, branched, often profusely so, usually consisting of a principal stem and smaller elongated branches, covered with the verrucose or rugose amplexicaul leaf-sheaths. Leaves 0.6–8 cm. long and 0.1–0.6 cm. broad, linear or linear-oblong, obtuse, apex usually unequally bilobed. Inflorescence of terminal few-flowered racemes; rachis fractiflex. Dorsal sepal 5–8 mm. long and 1.2–2 mm. broad, lanceolate, acute. Lateral sepals 5–8 mm. long and 1.2–2.5 mm. broad, lanceolate, acute. Petals 4.5–7 mm. long and 0.5–1 mm. broad, linear-elliptic or linear, acute. Lip unguiculate; claw adnate to the column; lamina 3.5–5 mm. long and 2–2.5 mm. broad, triangular-cordate or narrowly so, fleshy, the basal auricles usually erect; the disc appearing excavated, provided with a small trilobulate callus at the base.

Costa Rica and Panama.

CHIRIQUÍ: rain forest, Boquete District, alt. 1800 m., *Davidson 114, 348.*

70. EPIDENDRUM SCHLECHTERIANUM Ames, Sched. Orch. 7:9, *fig. 1.* 1924.

Nanodes discolor Lindl. in Bot. Reg. 18: *t. 1541.* 1832, non *Epidendrum discolor* Rich. & Gal.

Epidendrum brevicaule Schltr. in Fedde Rep. Sp. Nov. Beih. 17:30. 1922, non Schltr. 1921.

Epidendrum congestoides Ames & Schweinf. Sched. Orch. 10:61. 1930.

Dwarf, densely caespitose herbs up to 8 cm. tall. Stems short, covered with the equitant bases of the leaves. Leaves 1–3 cm. long and 0.2–1 cm. broad, linear-oblong to oblong-oval, obtuse, approximate, semi-equitant, spreading, fleshy. Inflorescence of 1 to few sessile flowers in the axils of the terminal leaves, shorter than the leaves to slightly exceeding them; flowers large for the plant. Dorsal sepal 8–20 mm. long and 3–4.5 mm. broad, lanceolate to oblanceolate, acute or acuminate. Lateral sepals 8–18 mm. long and 2–4.5 mm. broad, lanceolate to ovate-lanceolate, oblique, acute, serrulate-keeled along the mid-nerve dorsally, connate at the base with the claw of the lip. Petals 8–18 mm. long and 1–2.5 mm. broad, elliptic-linear to linear-lanceolate, entire or denticulate, acute. Lip 8–20 mm. long, long-unguiculate; claw adnate to the column, usually slightly longer than the column; lamina 4–8 mm. long and as broad, suborbicular-reniform to oblong-quadrate, apiculate, lobes more or less erect, fleshy. Clinandrium fimbriate-denticulate.

Mexico to Panama, Jamaica, Surinam, Brazil and Peru.

CANAL ZONE: near Vigia and San Juan, *Dodge, Steyermark & Allen 16562;* Río Azote Caballo, 66–70 m., *Dodge, Steyermark & Allen 16864;* San Juan, *Powell 18, 3465.*

Fig. 135. *Epidendrum Schlechterianum*

71. EPIDENDRUM SCHUMANNIANUM Schltr. in Fedde Rep. Sp. Nov. 9:215. 1911; Allen in Am. Orch. Soc. Bull. 10:359, *figs.* 1942.

Tall, caespitose, epiphytic herbs up to a meter or more long. Stems up to about 8 mm. in diameter, leafy above, covered with the maculate or verrucose leaf-sheaths, becoming naked and vernicose with age. Leaves 1.5–9 cm. long and 1–3.5 cm. broad, lanceolate to elliptic-oblong, obtuse or acutish, coriaceous. Inflorescence simple or usually a lax many-flowered panicle. Flowers multicolored and rather pretty. Dorsal sepal 8–12 mm. long and 3.5–4.5 mm. broad, oval to broadly oblanceolate, obtuse or acutish. Lateral sepals 8–12 mm. long and 3.5–5 mm. broad, oblanceolate to oval, obtuse or acute, oblique. Petals 8–15 mm. long and 5.5–8 mm. broad, obovate or obovate-spatulate, obtuse. Lip unguiculate; claw adnate to the basal half of the column; lamina 9–15 mm. long and 7.5–12

mm. broad, 3-lobed; the lateral lobes small, oblong, obtuse, explanate; terminal lobe obovate-cuneate, bilobulate or deeply bifid, anterior margins entire to crenulate; disc provided with 2 small submammillate calluses at the base and with 1–3 longitudinal callus-thickenings.

Costa Rica and Panama.

COCLÉ: hills north of El Valle de Antón, vicinity of La Mesa, alt. 1000 m., *Allen 2351, 2386;* El Valle, alt. 670 m., *Dudak s. n.*

72. EPIDENDRUM SCULPTUM Reichb. f. in Bonplandia 2:89. 1854.

Epidendrum colonense Ames, Sched. Orch. 1:14. 1922.

Pendent or repent epiphytic herbs up to about 50 cm. long. Stems simple or branched, densely leaved, covered with the chartaceous leaf-sheaths or becoming naked with age. Leaves 2–4.5 cm. long and 1–1.8 cm. broad, oblong or oblong-lanceolate, obtuse, retuse, coriaceous. Inflorescence with 1–3, usually 2, terminal flowers subtended by spathaceous bracts; flowers green or greenish-yellow. Dorsal sepal 10–14 mm. long and 2.5–3 mm. broad, lanceolate to oblong-lanceolate, obtuse. Lateral sepals 10–15 mm. long and about 3 mm. broad, oblong-lanceolate, oblique, acute. Petals 9–14 mm. long and 2–3 mm. broad, elliptic-linear to narrowly oblanceolate, oblique, obtuse. Lip unguiculate; claw adnate to the column; lamina 9–13 mm. long and 5.5–7 mm. broad, lanceolate-ovate, acute, 3-lobed; lateral lobes small, rounded, reaching to about the middle of the lip; mid-lobe lanceolate; disc provided with two callus-like thickenings at the base on the lateral lobes and with two longitudinal ridges along the median line and reaching to about the middle of the lip.

Possibly Honduras and Costa Rica. Panama, British and Dutch Guiana.

CANAL ZONE: near Vigia and San Juan, *Dodge, Steyermark & Allen 16583;* Gatún Lake, *Powell 116, 3407, 3410;* between Fort Clayton and Corozal, *Standley 29099.* COLÓN: Río Indio de Fato, *Pittier 4265.*

A specimen from Costa Rica, presumed to be this species, has an entire lip.

73. EPIDENDRUM STROBILIFERUM Reichb. f. in Nederl. Kruidk. Arch. 4:333. 1859

Epidendrum verecundum Schltr. in Fedde Rep. Sp. Nov. Beih. 17:42. 1922.
Spathiger strobiliferus Small, Man. Southeast. Fl. 390. 1933.

Small, repent or caespitose, epiphytic herbs up to about 2 dm. long. Stems slender, simple or branched, covered with amplexicaul leaf-sheaths. Leaves 8–45 mm. long and 2–10 mm. broad, from ligulate to elliptic-linear to linear-lanceolate, obtuse or acute, coriaceous, apex usually unequally bilobed. Inflorescence short, few-flowered, flexuose; bracts 5–8 mm. long, cucullate, obtuse, chartaceous; flowers small, inconspicuous. Dorsal sepal 3.5–5 mm. long and 1.2–1.5 mm. broad, linear-lanceolate, acute. Lateral sepals 3.5–5 mm. long and 1.8–2 mm. broad, ovate-lanceolate, oblique, acute. Petals 3–4.5 mm. long and 0.5–1 mm. broad, linear-oblanceolate, obtuse or acute. Lip 3–3.5 mm. long and 1.5–3 mm. broad, lanceolate-cordate to ovate-cordate, acute, ecallose. Ovary with a small

Fig. 136. *Epidendrum strobiliferum*

subscrotiform sac at the apex near the attachment of the lip.

Florida, Mexico to Panama, the West Indies, Venezuela, the Guianas, Brazil and Peru.

CANAL ZONE: foothills east of Panamá City, San Juan Range, and San Juan, *Powell 209, 350, 3435, 3453;* near Summit, *Standley 25747.* PANAMÁ: Río Tecúmen, north of Chepo Road, alt. 30 m., *Hunter & Allen 224.*

74. EPIDENDRUM SUBNUTANS Ames & Schweinf. in Sched. Orch. 10:73. 1930.

Caespitose, epiphytic herbs up to about 85 cm. tall. Stems slender, simple, covered with the amplexicaul leaf-sheaths, naked below. Leaves 4.5–18 cm. long and 0.8–4 cm. broad, elliptic-lanceolate to oval or ovate, acuminate or acute. Inflorescence terminal, paniculate, many-flowered; flowers relatively small. Dorsal sepal 5–6 mm. long and 1.2–2 mm. broad, oblanceolate, acute, sometimes papillose dorsally. Lateral sepals 5–6 mm. long and 1.7–2 mm. broad, oblanceolate to elliptic-oblanceolate, oblique, sometimes papillose dorsally. Petals 4–5 mm. long and 0.1–0.5 mm. broad, filiform to narrowly linear-oblanceolate, obtuse. Lip unguiculate; claw adnate to the column; lamina 2.5–3.5 mm. long and 4.5–5.5 mm. broad, 3-lobed, subreniform in outline; lateral lobes explanate, larger than the terminal lobe, dolabriform, margins crenate or undulate; mid-lobe subquadrate, retuse and with erect to spreading lobules; disc provided with a large oval central callus made up of 3 parallel ridges, the middle one extending to the apex of the lip.

Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, Boquete District, alt. 1800 m., *Davidson 43, 113;* "Chiriquí", *Powell 428;* vicinity of Bajo Mona and Quebrada Chiquero, alt. 1500 m., *Woodson & Schery 535, 541, 554;* Bajo Chorro, alt. 1900 m., *Woodson & Schery 648.*

Very closely allied to *Epidendrum paniculatum* Ruiz & Pavon, of which it may be but a small-flowered variety.

75. EPIDENDRUM TERETIFOLIUM Sw. Nov. Gen. & Sp. Prodr. 121. 1788.

Epidendrum teres Reichb. f. in Bonplandia 3:220. 1855, non Thunb.
Epidendrum teretifolium Sw. var. *Powellianum* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:41. 1922.

Caespitose or subrepent, epiphytic herbs up to about 35 cm. tall. Stems slender, simple, erect or ascending, covered with the amplexicaul leaf-sheaths, even in age. Inflorescence a single flower or a few-flowered fascicle borne on the apex of a peduncle which is up to about 8 cm. long, and subtended by chartaceous sheaths and 1 or 2 terminal leaves which are borne near the apex of the peduncle; the peduncle more or less ancipitous; flowers greenish or yellowish, segments fleshy. Dorsal sepal 8–10 mm. long and about 2 mm. broad, linear-lanceolate, acute. Lateral sepals 8–11 mm. long and 1.5–2 mm. broad, elliptic to lanceolate, slightly oblique, acute. Petals 4–6 mm. long and 1.2–1.5 mm. broad, oblanceolate, obtuse, the apex fleshy and thickened. Lip unguiculate; claw adnate to the basal part of the column; lamina 6–8 mm. long and 1–2 mm. broad, 3-lobed, elliptic; lateral

lobes small, rounded, erect, at about the middle of the lip; terminal lobe with a prominent lamellate callus which is higher than the lobe is broad, acute; disc provided with a small lamellate callus toward the base and a large one on the terminal lobe.

Mexico, Guatemala, Honduras, Nicaragua, Panama, the West Indies and Venezuela.

CHIRIQUÍ: Palo Alto, alt. 1200–1400 m., *Powell 240.*

76. EPIDENDRUM TETRACEROS Reichb. f. in Bot. Zeit. 10:733. 1852.

Much-branched epiphytic herbs, probably up to a meter or more long. Stems slender, covered with the scarious leaf-sheath bases when young, becoming naked with age, bearing leaves toward the ends of the stems. Leaves 3–7 cm. long and 0.2–0.8 cm. broad, linear to linear-lanceolate, acute. Inflorescence a few-flowered raceme, about as long as or shorter than the subtending leaves. Flowers with sepals and petals greenish, the lip white with purple-red markings. Dorsal sepal about 12–16 mm. long and 4–5 mm. broad, elliptic-lanceolate, acute or acuminate. Lateral sepals similar to the dorsal but slightly oblique. Petals 12–14 mm. long and 3–5 mm. broad, linear-oblanceolate, acute. Lip unguiculate; claw adnate to the column; lamina 10–12 mm. long and 11–14 mm. broad, fleshy, suborbicular, undulate-crenate, provided with 2 small lamellate calluses under the apex of the column (hidden by the clinandrium) and a large, thick, central callus made up of 3 or more ridges. Column winged laterally at the apex and with two apical stelidiar arms above the clinandrium.

Costa Rica and Panama.

CHIRIQUÍ: "Chiriquí", *Warscewicz;* near El Boquete, *Pittier 3115.*

77. EPIDENDRUM TRACHYTHECE Schltr. in Fedde Rep. Sp. Nov. 3:249. 1907.

Small, caespitose or repent, epiphytic herbs up to about 25 cm. long. Stems slender, leafy, simple or usually much branched, covered with the verrucose or rugose amplexicaul leaf-sheaths. Leaves 1–4.5 cm. long and 0.3–0.5 cm. broad, ligulate, obtuse, the apex retuse and unequally bilobed. Inflorescence short, a single flower, or usually a few-flowered flexuose raceme exceeded by the subtending leaves; bracts up to about 5 mm. long, chartaceous, cucullate, oblong to ovate. Flowers small, inconspicuous, greenish-yellow to white. Dorsal sepal 3–3.5 mm. long and 1.5–2 mm. broad, oblong to oval, obtuse or acute. Lateral sepals 3–3.5 mm. long and 2.2–3 mm. broad, oblong-ovate to suborbicular, slightly oblique, acute or obtuse. Petals 3–3.2 mm. long and 0.7–0.8 mm. broad, linear-oblong to oblanceolate, acute or obtuse. Lip unguiculate; claw adnate to the lower ⅔ of the column; lamina 2–2.5 mm. long and 3–3.5 mm. broad, transversely oval to subreniform, often short-apiculate; disc provided with a bilobate submammillate callus near the middle, the lobes sometimes somewhat separated.

Guatemala, Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, Boquete District, alt. 1800 m., *Davidson 124.*

78. Epidendrum triangulabium Ames & Schweinf. in Sched. Orch. 10:75 1930.

Small, caespitose or repent, epiphytic herbs up to about 20 cm. long. Stems slender, simple or branched, covered with the loose, keeled, amplexicaul leaf-sheaths, naked with age. Leaves 1.3–2.5 cm. long and 0.5–1.2 cm. broad, elliptic to oval, obtuse, coriaceous, apex obscurely bilobed. Inflorescence a single terminal or lateral flower. Flowers apparently cleistogamous. Dorsal sepal about 12 mm. long and 3 mm. broad, lanceolate, acute. Lateral sepals about 12 mm. long and 3 mm. broad, lanceolate, acute, oblique. Petals about 12 mm. long and 2 mm. broad, elliptic, acute, oblique. Lip unguiculate; claw adnate to the column; lamina about 6 mm. long and 9 mm. broad, sagittate-triangular, the apex of the lateral extensions and the terminal point acute.

Costa Rica and Panama.

coclé: vicinity of El Valle de Antón, alt. 600–1000 m., *Allen 1245*. ?panamá: near top of Cerro Campana, alt. 800–1000 m., *Allen 2223*.

We have seen no completely satisfactory material of this species.

79. Epidendrum Warszewiczii Reichb. f. in Bot. Zeit. 10:732. 1852; in Xenia Orch. 1:69, *t. 26*. 1854.

Small, erect, epiphytic herbs with relatively large flowers. Stem slender, few-leaved. Leaves (about 12–15 mm. long?) linear-ligulate, obtuse, apex bilobed. Inflorescence reflexed, many-flowered (illustration shows five). Perianth segments oblong, acute (in illustration apparently lanceolate, acute or acuminate); lip dilated in front, minutely denticulate, 3-lobulate (illustration shows: about 30 mm. long and 17 mm. broad, this presumed to be natural size, obovate, obscurely 3-lobed, denticulate margins); disc with 2 erect teeth (calluses) at the base and 3 elevated longitudinal lines.

Costa Rica and Panama according to Warscewicz.

panamá: "Costa Rica, Veraguas, Chiriqui", *Warscewicz*.

The collection locality of the single specimen known to exist was given by Reichenbach, in the second publication cited, as we have shown it. The description was taken from the original publication and from the plate cited.

80. Epidendrum lividum Lindl. in Bot. Reg. 24: Misc. p. 51. 1838; Ames, Hub. & Schweinf. Genus Epidendrum in U. S. & Mid. Am. 118. 1936.

Costa Rica, Venezuela and Colombia. Reported from Panama in cultivation.

28. DIACRIUM Lindl. ex Benth.

Diacrium Lindl. ex Benth. in Jour. Linn. Soc. Lond. 18:312. 1881; Benth. & Hook. Gen. Pl. 3:526. 1883; Pfitzer in Engler & Prantl, Nat. Pflanzenf. II, 6:146. 1888.

Epidendrum subg. *Diacrium* Lindl. in Hook. Jour. Bot. 3:81. 1841.

Caespitose epiphytic or semi-epiphytic herbs. Stems pseudobulbose, solid or hollowed by insect action. Leaves at or near the apex of the pseudobulbs, few.

Fig. 137. *Diacrium bilamellatum*

Inflorescence terminal, racemose, borne at the end of an elongated peduncle, few- to several-flowered. Sepals similar, free, spreading. Petals similar to the sepals. Lip free from the column and spreading, 3-lobed, provided with two horn-like processes toward the base which are hollow and open from the underside of the lip. Column short, footless, produced laterally into wings. Anther terminal, opercu-late, incumbent, 2-celled, the cells divided by a longitudinal septum; pollinia 4, laterally compressed, each one provided with a granular, viscid appendage.

Diacrium is closely allied to *Epidendrum*, from which it is easily, if superficially, distinguished by the hollow horn-like processes on the lip. A small genus of four or five species.

1. DIACRIUM BILAMELLATUM (Reichb. f.) Hemsl. in Godm. & Salvin, Biol. Centr.-Am. Bot. 3:222. 1883.

Epidendrum bilamellatum Reichb. f. in Walp. Ann. 6:345. 1862.
Diacrium bilamellatum var. *Reichenbachianum* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:47, in text. 1922.

Coarse, caespitose, epiphytic herbs up to about 60 cm. tall. Stems swollen, solid or hollowed by insects, cylindric to fusiform, provided with 1–4 leaves at the apex. Leaves 6–20 cm. long and 0.6–2.5 cm. broad, ligulate to ligulate-lanceolate, obtuse, fleshy. Inflorescence a short several-flowered raceme borne near the top of an elongated peduncle; peduncle up to 45 cm. long, provided with amplexicaul, chartaceous sheaths. Flowers pedicellate, one or few open at one time, perhaps often cleistogamous. Dorsal sepal 12–15 mm. long and about 6 mm. broad, oval, acute. Lateral sepals 11–16 mm. long and 5–6 mm. broad, elliptic-oval to lanceolate-ovate, acute. Petals 11–14 mm. long and 7–8 mm. broad, broadly obovate, short-unguiculate, acute. Lip free from the column and spreading; lamina 11–14 mm. long and 4–6 mm. broad, lanceolate-ovate in outline, 3-lobed, the lateral lobes small and often obscure above the middle of the lip, apices rounded; disc provided with two large lamellate horn-like processes near the middle, these processes hollow, 2–4 mm. high.

Guatemala, British Honduras, Costa Rica, Panama and Venezuela.

BOCAS DEL TORO: vicinity of Chiriquí Lagoon, *Wedel 2100*. CANAL ZONE: Chagres, *Behr;* open woods east of Panamá City, *Powell 67;* Culebra, *Pittier 3406*. PANAMÁ: swamp between El Jagua Hunting Club on Río Jagua and El Congor Hill, *Hunter & Allen 473;* San José and Trapeche Islands, Pearl Islands, *Miller 1890, 1909*. WITHOUT LOCALITIES: *Ames s. n.; Cowell 160; Johnston 703; Killip 3394*.

This species is said to have its stems often inhabited by ants. It is a lowland, coastal species.

29. CATTLEYA Lindl.

CATTLEYA Lindl. Collect. Bot. *t. 33 & t. 37*. 1824.

Epiphytic herbs with thick, fleshy or pseudobulbose stems, 1- to 2-foliate at the apex. Leaves coriaceous or fleshy, most often thick. Inflorescence terminal, usually subtended by a spathaceous bract; raceme simple; flowers often large and showy, usually few. Sepals subequal, free. Petals usually broader than the sepals. Lip sessile, broad, erect, free from or slightly adnate to the column, sides erect and usually enfolding the column. Column long, wingless, often somewhat arcuate; anther terminal, operculate, incumbent, each cell with a longitudinal septum; pollinia 4, parallel, ceraceous, broad, somewhat compressed.

One variety in Panama, about 30 in Central and South America. *Cattleya* is the most widely cultivated of the orchids. It hybridizes easily with *Laelia, Brassavola* and *Sophronitis* and the hybrid genera formed by these crosses.

Fig. 138. *Cattleya Skinneri* var. *autumnalis*

1. CATTLEYA SKINNERI Batem. var. AUTUMNALIS Allen in Ann. Missouri Bot. Gard. 29:345. 1942.

Epiphytic or semi-terrestrial herbs up to 4 dm. tall. Pseudobulbs 15–30 cm. long and 1–3 cm. in diameter, cylindric to fusiform, 2-, rarely 1-, leaved. Inflorescence a simple few-flowered raceme; spathe 5–10 cm. long, pergameneous. Leaves 10–15 cm. long and 3.5–5.5 cm. broad, elliptic to oblong-lanceolate, obtuse, coriaceous. Sepals 3–5 cm. long and 0.8–1.4 cm. broad, elliptic to broadly oblanceolate, acute. Petals 3–5 cm. long and 1–2.5 cm. broad, lanceolate to narrowly ovate or oval, obtuse or acute. Lip 3–4.5 cm. long and 2–3 cm. broad, oval to obovate, retuse, usually darker in color than the sepals and petals, enfolding the column.

Panama.

PANAMÁ: vicinity of Bejuca, alt. 15 m., *Allen 2668;* east of city, *Powell 16.* CANAL ZONE: Cañon Quebrada, *Pittier 6828.*

The Panamanian variety of a species distributed from Mexico to Costa Rica and the only known *Cattleya* in Panama. Autumn flowering, and the flowers smaller than in the species.

30. LAELIA Lindl.

LAELIA Lindl. Gen. & Sp. Orch. Pl. 115. 1831; Benth. & Hook. Gen. Pl. 3:533. 1883; L. Wms. in Darwiniana 5:74. 1941.

Schomburgkia Lindl. Sert. Orch. *t. 10.* 1838.

Epiphytic herbs often with showy flowers and ancipitous, terete, solid or hollow pseudobulbs. Sepals subequal, free, spreading, flat or undulate. Petals similar to the sepals, sometimes broader. Lip free from or slightly connate with the column, 3-lobed (or nearly simple), the lateral lobes enfolding the column or more or less explanate; disc smooth or lamellate; column long or short, winged or wingless. Anther operculate, incumbent, each cell divided into two by a septum and with each cell sometimes again divided by a more or less perfect septum; pollinia 8, 4 in each cell of the anther, ovate or compressed laterally, ceraceous.

The genus is to be found rather widely over tropical and subtropical America, where it is often exceedingly abundant. Some species are prized by orchid growers and are useful in hybridization. There are about 50 species in the genus.

a. Pseudobulbs less than 8 cm. long; sepals and petals plane..... 1. L. RUBESCENS
aa. Pseudobulbs more than 18 cm. long; sepals and petals undulated or twisted..... 2. L. LUEDDEMANII

1. LAELIA RUBESCENS Lindl. in Bot. Reg. 26: Misc. p. 20, *t. 41.* 1840.

Laelia peduncularis Lindl. loc. cit. 28: Misc. p. 9. 1842.

Caespitose epiphytic herbs up to 60 cm. tall. Pseudobulbs 1.5–7 cm. long and 1.5–4 cm. broad, oval to orbicular, ancipitous, 1-, rarely 2-, leaved. Leaves 4–20 cm. long and 2–4.5 cm. broad, elliptic, elliptic-lanceolate to ovate, obtuse, coriaceous. Inflorescence a long-pedunculate, few- to several-flowered raceme, terminal or rarely appearing laterally on undeveloped bulbs; bracts up to 1 cm. long, chartaceous, cucullate; flowers small to fairly large, white, or white with the base of the lip lavender to pink, or lavender throughout. Sepals 2–4.5 cm. long and 0.2–0.7 cm. broad, linear-lanceolate to elliptic, obtuse or acutish. Petals 2–4.5 cm. long and 0.3–1.5 cm. broad, elliptic or lanceolate, obtuse or acute. Lip 1.5–3.5 cm. long and up to 1.5 cm. broad, shorter than the sepals and petals, 3-lobed, provided with several inconspicuous longitudinal ridges; lateral lobes short, rounded and obtuse, enfolding the column; terminal lobe oblong-oval, blunt or retuse.

Mexico, Guatemala, Salvador, Nicaragua, Costa Rica and Panama.

CHIRIQUÍ: "N. W. corner of Chiriquí, near the Gulf of Dulce," cultivated by *Powell 64.*

Fig. 139. *Laelia rubescens*
(Flowers of species are normally resupinate)

2. LAELIA LUEDDEMANII (Prill.) L. Wms. in Ann. Missouri Bot. Gard. 27:282. 1940.

Schomburgkia Lueddemanii Prill. in Jour. Soc. Imp. Hort. Paris 8:275. 1862; Rolfe in Bot. Mag. 138: *t. 8427*. 1912.

Large, caespitose, epiphytic herbs up to a meter or more tall when in flower. Pseudobulbs 18–30 cm. long and 2–3 cm. broad, apparently somewhat ancipitous, largest toward the top, bifoliate. Leaves 20–35 cm. long and 4–6.5 cm. broad, lanceolate or elliptic, obtuse, coriaceous. Inflorescence a long-pedunculate, several-

to many-flowered raceme up to 75 cm. or more long; bracts up to 6 cm. long, linear to linear-lanceolate; flowers brown or maroon with a purple lip, medium-sized, long-pedunculate. Sepals and petals 2.5–5.5 cm. long, undulated, linear or spatulate, obtuse or acutish. Lip 1.3–2 cm. long and 1–1.3 cm. broad, 3-lobed, with 3 or more inconspicuous longitudinal carinae; lateral lobes rounded, obtuse, appressed to the column; terminal lobe orbicular-ovate, acute, recurved.

Costa Rica, Panama and possibly Venezuela.

CHIRIQUÍ: near city of David, at sea-level, *Powell 170*. COCLÉ: mountains beyond La Pintada, alt. 400–600 m., *Hunter & Allen 509*.

Laelia tibicinis (Batem.) L. Wms., in Darwiniana 5:77. 1941, has been reported from Panama but we have seen no specimens nor authentic record of it from the country.

31. BRASSAVOLA R. Br.

BRASSAVOLA R. Br. in Aiton, Hort. Kew., ed. 2, 5:216. 1813.

Epiphytic herbs with more or less thickened, 1- to 2-leaved stems. Sepals free, equal, spreading, linear or linear-lanceolate, often long and acuminate. Petals similar to the sepals. Lip sessile, erect, more or less enfolding the column, base short or long and narrow, expanded into a broad lamina which is plane, rarely concave or somewhat cucullate. Column erect, usually shorter than the claw of the lip, more or less bialate, footless; anther operculate, incumbent, each cell with an obscure longitudinal septum; pollinia 8, 4 in each cell of the anther, broadly ovate and laterally compressed, ceraceous.

A genus of about 15 species. Flowers often large and showy.

a. Flowering scapes subtended by a leaf, often as long as or longer than the leaf; inflorescence usually several-flowered ..... 1. B. NODOSA
aa. Flowering scape from the rhizome, not subtended by a leaf; inflorescence usually 1-flowered ..... 2. B. ACAULIS

1. BRASSAVOLA NODOSA (L.) Lindl. Gen. & Sp. Orch. Pl. 114. 1831; in Bot. Reg. 17: *t. 1465*. 1832.

Epidendrum nodosum L. Sp. Pl. 953. 1753.
Brassavola venosa Lindl. in Bot. Reg. 26: Misc. p. 20. 1840.
Brassavola scaposa Schltr. in Orchis 13:77. 1919.

Erect or pendent epiphytic herbs up to about 40 cm. long, usually less; flowers often showy. Stems or pseudobulbs 2–12 cm. long, cylindric, slender, 0.2–0.5 cm. in diameter, usually covered with a pergameneous sheath, 1-leaved. Leaves 6–23 cm. long and 0.3–2.5 cm. broad, either terete or flattened, if flattened then usually linear-elliptic, acute. Inflorescence borne at the end of the stem, either shorter or longer than the subtending leaf, few- to several-flowered. Sepals 4–9 cm. long and 0.2–0.4 cm. broad, linear, acute. Petals 4–9 cm. long, 0.05–0.2 cm. broad, filiform to linear, acute. Lip 4.5–8 cm. long and 2.5–4 cm. broad; base unguiculate and cucullate, enfolding the column; anterior portion broad, cordate to orbicular-cordate, acuminate or at least apiculate, having several prominent veins.

Fig. 140. *Brassavola nodosa*

Mexico to Panama, the West Indies and northern South America. Common at lower elevations in Central America.

BOCAS DEL TORO: Shepherd Hill, *Wedel 2;* vicinity of Chiriquí Lagoon, *Wedel 1413, 1995, 2644.* CANAL ZONE: vicinity of Fort Sherman, *Allen 2844;* France Field, *Powell 25;* between Tumba Vieja and Salamanca, *Steyermark & Allen 16753.* PANAMÁ: vicinity of La Palma, *Pittier 6689;* Trapiche Island, *Allen 2608;* Taboga Island, *Killip 3181;* Hacienda La Joya, *Dodge et al 16903;* Isla Taboga, *Woodson, Allen & Seibert 1487;* Cativo, *Lee s. n.* VERAGUAS: Cerro Pena de Cristo, alt. 1500 m., *Powell 422.*

2. BRASSAVOLA ACAULIS Lindl. in Paxt. Flow. Gard. 2:152, *fig. 216.* 1851-52.

Brassavola lineata Hook. in Bot. Mag. 79: *t. 4734.* 1853.

Pendent epiphytic herbs up to about 80 cm. long. Stems 2–7 cm. long, 0.2–0.5 cm. in diameter, cylindrical, unifoliate. Leaves 40–80 cm. long, 0.3–2 cm. in diameter, terete, fleshy. Inflorescence borne from the rhizome on short peduncles (stems?), 1-, rarely 2-, flowered, much shorter than the leaves. Sepals and petals 7–8 cm. long, 0.3–0.6 cm. broad, linear, acute. Lip 5.5–6.5 cm. long and 2.5–3.5 cm. broad; base unguiculate, cucullate, enfolding the column; anterior part orbicular to orbicular-cordate, acute or acuminate, prominently veined.

Panama, reported also from Costa Rica and Guatemala.

CHIRIQUÍ: "province of Chiriquí," alt. 1200 m., *Powell 102;* "Chiriquí province," *Svihla s. n.;* Boquete District, alt. 1200 m., *Davidson 683.*

32. SCAPHYGLOTTIS Poepp. & Endl.

SCAPHYGLOTTIS Poepp. & Endl. Nov. Gen. & Sp. 1:58. 1835.

Cladobium Lindl. Nat. Syst. Bot. 446. 1836 (or 1835?).
Hexadesmia Brongn. in Ann. Sci. Nat. Bot. II, 17:44. 1842.

Caespitose or repent epiphytic herbs. Stems indurated or pseudobulbose, simply branched, or fasciculately branched (superimposed) above. Leaves 1–3 from the apex of the segments of the stem or pseudobulbs, thin and grass-like to coriaceous or fleshy and terete. Inflorescence a fascicle or a raceme, terminal on the growths or segments of the stem. Sepals subequal, erect. Petals similar to the sepals but usually smaller. Lip articulated from the tip of the column-foot or subarticulated, straight, geniculate, reflexed or recurved, clawed or clawless, entire or 3-lobed, often emarginate. Column short, wingless or winged or auriculate, produced into a more or less distinct foot at the base; anther terminal, operculate, incumbent, the loculae provided with longitudinal septae; pollinia 4 or 6, if 6 then all of equal size or two smaller than the others, ceraceous, laterally compressed (at least 4 of each set compressed).

A difficult but interesting genus of some 40 or 50 species. The generic name *Scaphyglottis* should, in all probability, be substituted by *Cladobium* Lindl. The original generic description of *Scaphyglottis* obviously applies more to *Scaphyglottis parviflora* Poepp. & Endl. than to any of the other component species. Of the species described in the original publication most are *Maxillaria*, and the generic description applies best to those species which belong to the genus *Maxillaria.*

a. Inflorescence about as long as or longer than the subtending leaves..... 1. S. MICRANTHA
aa. Inflorescence much shorter than the subtending leaves, commonly less than half as long.
b. Lip with short, acute, dentiform lateral lobes originating about the middle of the lip..... 12. S. BILINEATA
bb. Lip without short, acute, dentiform lateral lobes.
c. Column provided with stelidiar arms or teeth near the apex or near the middle.
d. Stelidiar arms near the apex of the column.
e. Lip entire or at most obscurely trilobulate..... 5. S. LAEVILABIA
ee. Lip trilobate, the lateral lobes distinct..... 7. S. AMETHYSTINA
dd. Stelidiar arms near the middle of the column..... 9. S. MESOCOPIS
cc. Column lacking stelidiar arms or teeth near the apex or near the middle, sometimes auriculate.
d. Lip widest at the middle or toward the base.
e. Leaves about five times longer than broad, linear-elliptic to elliptic to oblanceolate..... 3. S. LINDENIANA
ee. Leaves at least ten times longer than broad, linear to linear-lanceolate.
f. Lip rhombic-lanceolate, broadest below the middle..... 11. S. TENELLA
ff. Lip obovate to oblong, broadest across the auriculate lobes near the middle..... 10. S. MINUTIFLORA
dd. Lip widest above the middle, usually near the apex.
e. Leaves relatively short and broad, mostly less than 6 cm. long..... 4. S. CUNEATA
ee. Leaves relatively long and narrow, grass-like, mostly more than 6 cm. long (if less, then only 1–2 mm. broad).
f. Lip 3-lobed and with the lobes about equal in length..... 6. S. LONGICAULIS
ff. Lip simple or obscurely 3-lobed, if lobed then the lateral lobes shorter than the mid-lobe.
g. Lip pandurate or subpandurate, terminal lobe broad, rounded and apiculate..... 2. S. ACOSTAEI
gg. Lip not pandurate nor subpandurate, terminal lobe retuse..... 8. S. BEHRII

1. SCAPHYGLOTTIS MICRANTHA (Lindl.) Ames & Correll in Bot. Mus. Leafl. Harv. Univ. 10:85. 1942.

Hexadesmia micrantha Lindl. in Bot. Reg. 30: Misc. 2. 1844; Reichb. f. Xenia Orch. 1:70, *t. 59, figs. III, 6–10.* 1856.

Small, caespitose, epiphytic herbs up to about 20 cm. tall. Stems pseudobulbose, fusiform, stipitate, simple or rarely superimposed, 1- or usually 2-leaved at the apex. Leaves 3–12 cm. long and 0.15–0.5 cm. broad, linear, obtuse, usually bilobed at the apex. Inflorescence a terminal, slender, few- to many-flowered raceme about as long as or exceeding the leaves in length; flowers small. Dorsal sepal about 1.5 mm. long and 0.75 mm. broad, oval, acute. Lateral sepals 1.5–2 mm. long and 1–1.5 mm. broad, ovate, acute. Petals 1.5–2 mm. long and about 1 mm. broad, oval or ovate, obtuse. Lip 1.2–2 mm. long and 1.5–2.5 mm. broad, subreniform, trilobate,—in natural position the lateral lobes erect and surrounding the column and the terminal lobe deflexed.

Guatemala, Salvador, Honduras, Nicaragua, Costa Rica and Panama.

"VERAGUAS and CHIRIQUÍ": *Warscewicz.*

The smallest-flowered species of the genus.

2. SCAPHYGLOTTIS ACOSTAEI (Schltr.) C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 10:27. 1941.

Hexadesmia Powellii Schltr. in Fedde Rep. Sp. Nov. Beih. 17:27. 1922, non *Scaphyglottis Powellii* Schltr.
Hexadesmia Acostaei Schltr. loc. cit. 19:293. 1923.

Small, slender, densely caespitose, epiphytic herbs up to 30 cm. tall. Pseudobulbs 2.5–12 cm. long and 0.1–0.6 cm. in diameter, the upper part swollen and fusiform, the lower part forming a slender stipe, 1- or usually 2-, leaved. Leaves 5–14 cm. long and 0.1–0.3 cm. broad, linear, obtuse, the apex usually bilobed. Inflorescence a short, terminal, few-flowered raceme, much exceeded by the leaves. Flowers small, usually white with a dark lip. Sepals 3–4 mm. long and 1.4–1.8 mm. broad, lanceolate to ovate-lanceolate, acuminate. Petals 3–4 mm. long and 1.4–2 mm. broad, lanceolate or lanceolate-oblong, acute. Lip 3–4 mm. long and 2.5–4 mm. broad, oblong or oblong-subquadrate, pandurate, acute or retuse and apiculate.

Costa Rica and Panama.

CHIRIQUÍ: Volcán de Chiriquí, alt. 2100 m., *Davidson 867;* slope of Cerro de la Horqueta, alt. 1200–1700 m., *Maxon 5399;* alt. 1500 m., *Powell 225.*

3. SCAPHYGLOTTIS LINDENIANA (Rich. & Gal.) L. Wms. in Ann. Missouri Bot. Gard. 28:423. 1941.

Hexadesmia fasciculata Brongn. in Ann. Sci. Nat. Bot. II, 17:45. 1842, non *Scaphyglottis fasciculata* Hook.
Hexadesmia Lindeniana Rich. & Gal. in Ann. Sci. Nat. Bot. III, 3:23. 1845.
Hexadesmia pachybulbon Schltr. in Fedde Rep. Sp. Nov. Beih. 17:26. 1922.

Small to large and coarse epiphytic herbs up to about 50 cm. tall. Stems usually stipitate below, swollen into an ellipsoidal or fusiform pseudobulb above, bifoliate. Leaves 5–25 cm. long and 1.5–5 cm. broad, linear-elliptic to elliptic to lanceolate to oblanceolate, acute, coriaceous. Inflorescence a fascicle of flowers borne at the apex of the pseudobulb. Dorsal sepal 7–11 mm. long and 1.5–2 mm. broad, elliptic, acute. Lateral sepals 7–11 mm. long and 2–3 mm. broad, lanceolate, arcuate, acute. Petals 6–10 mm. long and 1.5–3 mm. broad, elliptic-lanceolate, acute. Lip 6.5–10 mm. long and 2.5–4.5 mm. broad, oblanceolate to narrowly obovate, obscurely 3-lobed, obtuse, apiculate.

Mexico, Guatemala, Costa Rica and Panama.

CHIRIQUÍ: "Province of Chiriquí," alt. 1500 m., *Powell 229, 3149.* COCLÉ: hills north of El Valle de Antón, alt. 800–1000 m., *Allen 2291;* mountains beyond La Pintada, alt. 400–600 m., *Hunter & Allen 601.*

Scaphyglottis falcata C. Schweinf. is possibly only a somewhat larger-flowered form of this variable species.

4. SCAPHYGLOTTIS CUNEATA Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:398. 1918.

Scaphyglottis prolifera (R. Br.) Cogn. and other authors as to plants, not according to name-bringing synonym.
Tetragamestus gracilis Schltr. loc. cit. 400.

Scaphyglottis Wercklei Schltr. in Fedde Rep. Sp. Nov. Beih. 19:28. 1923.
Scaphyglottis gracilis Schltr. loc. cit.
Isochilus prolifera Lindl. ex C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 11:181. 1944, non R. Br.

Small, caespitose or repent, epiphytic herbs up to about 25 cm. long. Stems pseudobulbose, usually superimposed; pseudobulbs slender and cylindric to narrowly fusiform, usually bifoliate at the top of each segment of the growth. Leaves 1–6 cm. long and 0.1–0.7 cm. broad, linear or ligulate to elliptic-oblong, obtuse, usually retuse. Inflorescence a single flower or a few-flowered fascicle borne at the apex of the segments of the stem. Dorsal sepal 3.5–4.5 mm. long and 1.2–1.5 mm. broad, elliptic to elliptic-oval, acute, cucullate. Lateral sepals 4–5 mm. long and 1.5–2.5 mm. broad, linear-oblong, oblique, acute, forming an inconspicuous mentum at the base. Petals 3.5–5 mm. long and 0.5–0.6 mm. broad, linear to linear-ligulate, obtuse or acute, slightly oblique. Lip 4–6 mm. long and 2.5–4 mm. broad toward the apex, unguiculate, cuneate-flabellate, the apical part semi-orbicular, obtuse, entire or trilobate; disc with a small flabellate or bipartite callus toward the apex of the claw or rarely ecallous. Column without stelidiar arms.

Guatemala, British Honduras, Honduras, Nicaragua, Costa Rica and Panama, the West Indies and in South America to Brazil and Bolivia.

CANAL ZONE: near Río Medio, *Miller 1747;* San Juan Range, *Powell 349;* hills north of Frijoles, *Standley 27668.* COCLÉ: vicinity of El Valle de Antón, alt. 600–1000 m., *Allen 1248.*

5. SCAPHYGLOTTIS LAEVILABIA Ames in Proc. Biol. Soc. Wash. 34:154. 1921, as *S. laevilabium.*

Similar to *Scaphyglottis cuneata* except the disc of the lip always ecallous and the column with two small stelidiar arms about opposite the stigmatic cavity.

Panama.

PANAMÁ: Juan Díaz, alt. 50 m., *Killip 3113;* foothills east of Panamá City, *Powell 211.*

6. SCAPHYGLOTTIS LONGICAULIS S. Wats. in Proc. Am. Acad. 23:286. 1888.
Scaphyglottis unguiculata Schltr. in Fedde Rep. Sp. Nov. 12:206. 1913.

Slender, caespitose, epiphytic herbs up to about 30 cm. tall. Stems slender, the pseudobulbs cylindric, simple or rarely superimposed, bearing 1 or 2 leaves at the summit of the segments. Leaves 4–16 cm. long and 0.1–0.3 cm. broad, linear. Inflorescence one-flowered, or a few-flowered fascicle at the apex of the stem or of segments of the stem. Dorsal sepal 5–7 mm. long and about 1.5 mm. broad, linear-oblong to linear-oblanceolate, acute, somewhat cucullate. Lateral sepals 5.5–7 mm. long and 1.5–2 mm. broad, linear-oblong, acute, forming a distinct mentum at the base. Petals 5–7 mm. long and about 0.7–1 mm. broad, linear-oblanceolate, obtuse or acute. Lip 5–7 mm. long and 3–4 mm. broad near the apex, unguiculate, cuneate-flabellate, trilobate at the apex; disc ecallous. Column sometimes with lateral teeth at the apex.

Guatemala, Honduras, Costa Rica, Panama and Colombia.

CANAL ZONE: Barro Colorado Island, *Kenoyer 251;* hills east of Panamá City, *Powell 105, 3392;* hills north of Frijoles, *Standley 27664;* Río Indio, *Steyermark & Allen 17442.* COLÓN: Loma de la Gloria, *Pittier 4090.* DARIÉN: vicinity of El Real, alt. 15 m., *Allen 944.*

7. SCAPHYGLOTTIS AMETHYSTINA (Reichb. f.) Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:456. 1918.

Ponera amethystina Reichb. f. in Saunders Ref. Bot. 2: *t. 93.* 1869.
Scaphyglottis brachiata Schltr. in Fedde Rep. Sp. Nov. 9:432. 1911.

Caespitose epiphytic herbs up to about 25 cm. tall. Stems simple or superimposed, segments cylindric to fusiform, often distinctly stipitate, bearing 1 or usually 2 leaves at the apex of each segment. Leaves 3–12 cm. long and 0.4–1 cm. broad, linear, linear-lanceolate to elliptic, obtuse, the apex retuse and unequally bilobed. Inflorescence a few-flowered fascicle borne at the apex of the segments. Dorsal sepal 4.5–6 mm. long and about 1.5 mm. broad, elliptic to oblanceolate, acute, cucullate. Lateral sepals 5–7.5 mm. long and 1.5–2 mm. broad, linear-oblong to lanceolate, acute, forming a short mentum at the base. Petals 4.5–5 mm. long and 0.8–1.2 mm. broad, linear-oblong and unguiculate to oblanceolate, acute. Lip 6–8 mm. long and 3–5 mm. broad, cuneate, obovate, 3-lobed, the lateral lobes large, rounded, situated above the middle of the lip; mid-lobe subquadrate, obtuse, rarely emarginate, exceeding the lateral lobes. Column with 2 stelidiar arms near the apex.

Costa Rica and Panama.

CANAL ZONE: Chagres River, sea-level, *Powell 358.* CHIRIQUÍ: vicinity of San Felix, alt. 0–120 m., *Pittier 5193.*

8. SCAPHYGLOTTIS BEHRII (Reichb. f.) Benth. & Hook. ex Hemsl. in Godm. & Salvin, Biol. Centr.-Am. Bot. 3:219. 1883; C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 7:186. 1939.

Ponera Behrii Reichb. f. in Bonplandia 3:220. 1855.
Ponera albida Reichb. f. in Beitr. Orch. Centr.-Am. 103. 1866.
Scaphyglottis pauciflora Schltr. in Fedde Rep. Sp. Nov. 3:47. 1906.
Scaphyglottis albida Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:456. 1918.

Caespitose, epiphytic or pendent herbs up to about 45 cm. long. Stems simple or superimposed; segments cylindric to narrowly elliptic or narrowly fusiform, 1-leaved or usually 2-leaved at the apex, at least the lower segment stipitate. Leaves 5–26 cm. long and 0.15–0.45 cm. broad, linear, obtuse, obscurely bilobed at the apex. Inflorescence a single flower or a few-flowered fascicle or one or more much abbreviated few-flowered racemes borne at the apex of the segments of the stem. Dorsal sepal 3–4 mm. long and 1–1.5 mm. broad, elliptic-oblong to elliptic-oval, obtuse, cucullate. Lateral sepals 3.5–4.5 mm. long and 1.2–2 mm. broad, linear-oblong to oblong, acute. Petals 3–4 mm. long and 0.5–1 mm. broad, linear to linear-lanceolate, obtuse, more or less unguiculate. Lip 3.5–5 mm. long and 2–3.5 mm. broad, narrowly obovate, unguiculate, entire to obscurely 3-lobed, obtuse and rarely shallowly retuse. Column with a narrow wing.

Guatemala, British Honduras, Honduras, Nicaragua, Costa Rica, Panama and Colombia.

CANAL ZONE: Chagres, *Behr;* near Gatún, *Hayes;* hills east of Panamá City, Juan Díaz Range, San Juan Range, La Pita, McComber Hill, Frijoles, Juan Díaz, *Powell 126, 359, 363, 367, 369, 373, 374, 378, 3506;* Barro Colorado Island, *Woodworth & Vestal 592.* CHIRIQUÍ: Lino Hill, *Powell 385.* PANAMÁ: Río Tecúmen, *Hunter & Allen 229.* VERAGUAS: Bahia Honda, *Taylor 1507.*

It is possible that the historical type of *Scaphyglottis Behrii* is not the species commonly interpreted as such. We have not seen the original specimen collected by Behr. A record from the Reichenbach herbarium (not from the type) does not match too well.

9. SCAPHYGLOTTIS MESOCOPIS (Endr. & Reichb. f.) Benth. & Hook. ex Hemsl. in Biol. Centr.-Am. Bot. 3:220. 1883.

Ponera mesocopis Endres & Reichb. f. Xenia Orch. 2:222, *t. 200.* 1874.
Scaphyglottis Powellii Schltr. in Fedde Rep. Sp. Nov. Beih. 17:28. 1922.

Caespitose, erect or repent, epiphytic herbs up to about 50 cm. long. Stems pseudobulbose, cylindric or usually fusiform, commonly stipitate; segments superimposed, 1- to 2-leaved at the apex, the lower segment often bearing a fascicle of stems at its apex. Leaves 3–17 cm. long and 0.2–0.7 cm. broad, linear, obtuse, usually bilobate at the apex. Inflorescence a few-flowered fascicle or a much-abbreviated raceme borne at the apex of the segments of the stem. Dorsal sepal 5.5–7 mm. long and 1.8–2.5 mm. broad, elliptic to elliptic-oblong, acute. Lateral sepals 6–8 mm. long and 1.8–2.5 mm. broad, linear-oblong to lanceolate-oblong, acute or obtuse, slightly arcuate, forming a short mentum at the base. Petals 5–7 mm. long and 1.4–2 mm. broad, linear-oblong to elliptic-lanceolate, acute or obtuse, short-unguiculate. Lip 7–10 mm. long and 3.5–4.5 mm. broad, oblong-subpandurate, usually broadest near the apex, cuneate to the base and short-unguiculate, obtuse and emarginate, obscurely denticulate; disc with one or more of the median lines raised and papillose. Column with two stelidiar arms originating at about the middle.

Costa Rica and Panama.

CANAL ZONE: hills east of Panamá City, *Powell 134.* CHIRIQUÍ: vicinity of Boquete, near Río Caldera, alt. 1300 m., *Allen 2282;* Boquete, alt. 1200 m., *Davidson 1283;* "Province of Chiriquí," alt. 1000 m., *Powell 134.* COCLÉ: vicinity of La Mesa north of El Valle de Antón, alt. 1000 m., *Allen 2316;* region north of El Valle de Antón, alt. 800 m., *Allen 2926.*

The Powell record for the Canal Zone is doubtless in error, for the same number is used for the specimen from Chiriquí.

10. SCAPHYGLOTTIS MINUTIFLORA Ames & Correll in Bot. Mus. Leafl. Harv. Univ. 10:83, *t. 9.* 1942.

Caespitose epiphytic herbs up to about 75 cm. tall. Stems slender, cylindric to slightly fusiform, superimposed, 1- to 2-leaved from the apex of the segments. Leaves 5–18 cm. long and 0.3–1 cm. broad, linear, acute or obtuse, retuse and unequally bilobed at the apex. Inflorescence a few-flowered fascicle, borne at the apex of segments of the stem. Dorsal sepal about 2.4 mm. long and 1.3 mm.

SCAPHYGLOTTIS

minutiflora Ames & Correll

Fig. 141. *Scaphyglottis minutiflora*

broad, oval, acute. Lateral sepals about 2.5 mm. long and 1.4 mm. broad, elliptic-oblong, acute, forming an inconspicuous mentum at the base. Petals about 2.2 mm. long and 0.6 mm. broad, narrowly elliptic-oblong, acute or obtuse. Lip 2.5–4 mm. long and 1.5–2.5 mm. broad, obovate to oblong, obtuse or obscurely retuse, provided with small, semi-orbicular, auriculate lobes near the middle.

Guatemala, British Honduras and Panama.

COCLÉ: hills north of El Valle de Antón, alt. 800–1000 m., *Allen 2258.*

It is possible that the Panamanian material is different from the Guatemalan type.

11. SCAPHYGLOTTIS TENELLA L. Wms. in Ann. Missouri Bot. Gard. 28:423, *t. 24.* 1941.

Caespitose, erect or spreading, epiphytic herbs up to about 50 cm. long. Stems slender, cylindric or becoming swollen and fusiform above, simple, bifoliate at the apex. Leaves 20–23 cm. long and 0.7–1.6 cm. broad, linear to linear-lanceolate, acute, the apex minutely bilobed. Inflorescence a 1- to few-flowered fascicle at the apex of the stem. Dorsal sepal 8–9 mm. long and 3–4 mm. broad, lanceolate, acute. Lateral sepals 8–9 mm. long and 3–4 mm. broad, lanceolate, acute. Petals 8–9 mm. long and 3–3.5 mm. broad, oblong-lanceolate, acute or obtuse. Lip 8–9 mm. long and 4–5 mm. broad, rhombic-lanceolate but somewhat constricted above the middle, fleshy.

Panama.

COCLÉ: hills noith of El Valle de Antón, alt. 800–1000 m., *Allen 2276.*

12. SCAPHYGLOTTIS BILINEATA (Reichb. f.) Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:456. 1918.

Ponera bilineata Reichb. f. Beitr. Orch. Centr.-Am. 88. 1866.

Erect or spreading, caespitose, epiphytic herbs up to about 30 cm. long. Stems slender, simple or superimposed, cylindric, 1- to 2-foliate at the apex of the segments. Leaves 6–9 cm. long and 0.7–1.1 cm. broad, ligulate to linear-lanceolate, obtuse. Inflorescence a 1- to few-flowered fascicle borne at the apex of the segments. Dorsal sepal about 7 mm. long and 2 mm. broad, elliptic or oblanceolate, obtuse. Lateral sepals about 8 mm. long and 2.5 mm. broad, lanceolate-oblong, slightly arcuate, acute. Petals about 7 mm. long and 0.8 mm. broad, linear, obtuse. Lip about 9 mm. long and 3.5 mm. broad, cuneate-unguiculate to the base, 3-lobed; the lateral lobes originating above the middle, dentiform; the mid-lobe suborbicular-flabellate, slightly retuse; disc fleshy, especially the basal portion, with the median line callus-thickened toward the apex. Column auriculate at the apex.

Costa Rica and Panama.

CANAL ZONE: Quebrada Lopez, alt. 30 m., *Allen 2139.* COCLÉ: hills north of El Valle de Antón, alt. 800–1000 m., *Allen 2263.*

May be expected to be more variable than the description indicates.

Fig. 142. *Scaphyglottis tenella*

OBSCURE SPECIES

SCAPHYGLOTTIS DOLICHOPHYLLA Schltr. in Fedde Rep. Sp. Nov. Beih. 17:28. 1922.

Panama.

This species is based on *Powell 126* of which I have seen two specimens. One of these is *Scaphyglottis Behrii*, while the other is very similar but recalls in some respects Schlechter's analysis of S. *dolichophylla*.

33. PLATYGLOTTIS L. Wms.

PLATYGLOTTIS L. Wms. in Ann. Missouri Bot. Gard. 29:345, *t. 34.* 1942.

Caespitose, epiphytic herbs from a very short rhizome. Stems slender, non-pseudobulbose, indurated, simple. Leaves alternate, distichous, coriaceous, plane, deciduous; leaf-sheaths tightly enfolding the stem. Inflorescence terminal (or subterminal?), racemose. Sepals subequal; dorsal sepal free; lateral sepals adnate to the short column-foot at their bases and with it forming an inconspicuous mentum. Petals similar to the sepals or broader. Lip articulated to the apex of the column-foot; lamina broadly ligulate, entire. Column short, clavellate, wingless, produced into a short foot at the base; anther terminal, operculate, incumbent, 6-loculate; pollinia 6, equal, 4 basal and laterally compressed in one series, 2 terminal in a second laterally compressed series, ceraceous.

A single species known only from the vicinity of El Valle de Antón, Coclé Province, Panama.

1. PLATYGLOTTIS CORIACEA L. Wms. in Ann. Missouri Bot. Gard. 29:347, *t. 34.* 1942.

Epiphytic, caespitose herbs up to about 4.5 dm. tall. Stems 5–8 mm. in diameter, slender, leafy, becoming naked with age. Leaves 2.5–6 cm. long, 1–1.5 cm. broad, narrowly ligulate, obtuse, obscurely and unequally bilobed at the apex, coriaceous, distichous. Inflorescence a short, few-flowered raceme, terminal or subterminal; bracts 7–20 mm. long, elliptic-lanceolate, acute, cucullate; flowers rather large for the tribe, sepals and petals lavender, the lip lavender with greenish margins. Dorsal sepal about 10 mm. long and 3.5 mm. broad, lanceolate, acute or acuminate, 5-nerved. Lateral sepals about 10 mm. long and 3 mm. broad, lanceolate, acute or acuminate, slightly oblique, 5-nerved. Petals about 10 mm. long and 3.5 mm. broad, elliptic-oblanceolate, somewhat oblique, obscurely constricted near the apex, 5- to 7-nerved. Lip about 10 mm. long and 5 mm. broad toward the apex, broadly ligulate, subpandurate, entire, apex rounded, the margins thin and plicated laterally; disc fleshy, with a pair of inconspicuous, subumbonate calluses at the base.

Panama.

COCLÉ: north of El Valle de Antón, alt. about 1000 m., *Allen 2936.*

Fig. 143. *Scaphyglottis coriacea*

34. ISOCHILUS R. Br.

ISOCHILUS R. Br. in Ait. Hort. Kew. ed. 2, 5:209. 1813; Correll in Bot. Mus. Leafl. Harv. Univ. 10:1. 1941.

Caespitose, epiphytic herbs with slender stems and distichous leaves. Inflorescence a terminal, often unilateral raceme. Sepals subequal, free or connate into a short tube at the base, sometimes more or less subsaccate at the base. Petals about as long as the sepals. Lip subequal to the petals, simple, adnate to the base of the column or column-foot, often semiterete, wingless; column-foot very short and inconspicuous; pollinia 4, ceraceous, elongated and laterally compressed.

Closely allied to *Ponera* and *Jacquiniella*. According to Correll, the genus consists of two species, both variable.

1. ISOCHILUS MAJOR Cham. & Schlecht. in Linnaea 6:60. 1831; Correll in Bot. Mus. Leafl. Harv. Univ. 10:9. 1941.

Isochilus chiriquensis Schltr. in Fedde Rep. Sp. Nov. Beih. 17:25. 1922.

Caespitose, erect or spreading, slender, epiphytic herbs. Stems simple, slender, leafy. Leaves 2–10 cm. long and 0.2–0.8 cm. broad, linear to linear-elliptic, obtuse, emarginate and unequally bilobed at the apex. Inflorescence secund, usually several- to many-flowered; flowers subtended by conspicuous chartaceous bracts. Dorsal sepal 7–11 mm. long and 3–4 mm. broad, elliptic-oblong, acute or obtuse. Lateral sepals 8–12 mm. long and 3–4.5 mm. broad, oblong-lanceolate, acute, keeled toward the base, and the keel decurrent onto the ovary. Petals 7–11 mm. long and 2–3 mm. broad, oblanceolate, acute or obtuse. Lip 8–12 mm. long and 1.5–3 mm. broad, elliptic-linear to

Fig. 144. *Isochilus major*

Fig. 145
Bothriochilus macrostachyus

linear-oblong to oblanceolate, acute or obtuse, entire or obscurely lobed, geniculate and fleshy at the base.

Mexico, Guatemala, Honduras, Costa Rica, Panama and Jamaica.

CHIRIQUÍ: Río Quebrada, alt. 1700 m., *Killip 3532;* "Province of Chiriquí," alt. 1200 m., *Powell 98, 3380;* Bajo Mona, alt. 1500–2000 m., *Woodson, Allen & Seibert 1003;* vicinity of Bajo Mona, alt. 1500 m., *Woodson & Schery 518.*

35. BOTHRIOCHILUS[1] Lemaire

BOTHRIOCHILUS Lemaire, Illustr. Hort. 3:Misc. p. 31. 1856; L. Wms. in Bot. Mus. Leafl. Harv. Univ. 8:145. 1940.

Epiphytic herbs with the stems reduced to ovoid or lageniform pseudobulbs. Pseudobulbs several-leaved at their apices, the petioles of the leaves simulating stems. Inflorescence lateral from the base of the pseudobulbs. Dorsal sepal free. Lateral sepals adnate to the column-foot and with it forming a mentum. Petals similar to the dorsal sepal but usually shorter. Lip simple or obscurely lobed, about as long as the petals, shortly and sharply declined at the base or even saccate, if saccate the sac sometimes didymous. Column erect, long and slender, wingless or nearly so; column-foot about as long as the column or longer; pollinia 8, ceraceous. Ovary wingless.

A single species is known from Panama.

1. BOTHRIOCHILUS MACROSTACHYUS (Lindl.) L. Wms. in Bot. Mus. Leafl. Harv. Univ. 8:148. 1940.

Coelia macrostachya Lindl. in Benth. Pl. Hartw. 92. 1842; Hook. in Bot. Mag. 79: *t.* 4712. 1853; Reichb. f. Beitr. Orch. Centr.-Am. 41. 1866.

[1] To this genus belong all of the species previously referred to *Coelia*, except the type species.

Coelia macrostachya Lindl. var. *genuina* Reichb. f. loc. cit.
Coelia macrostachya Lindl. var. *integrilabia* Reichb. f. loc. cit.

Epiphytic herbs up to about 90 cm. tall. Pseudobulbs up to about 8 cm. long, ovoid to semi-globose, often somewhat compressed, surrounded with scarious sheaths at the base, bearing 3–6 leaves at the summit. Leaves 30–100 cm. long and 0.8–2.5 cm. broad, linear to elliptic-ligulate, acute or acuminate, plicate, sheathing at the base. Inflorescence a densely flowered, more or less elongated raceme, lateral, up to about 50 cm. long, the scape somewhat flexuous, covered with chartaceous bracts; the rachis provided with conspicuous linear to lanceolate, acute or acuminate bracts up to about 7 cm. long. Dorsal sepal 7.5–11 mm. long and 3–5 mm. broad, elliptic-ovate to ovate, acute, rugose dorsally. Lateral sepals 10–14 mm. long and 4–5 mm. broad, oblong-lanceolate, acute, free but forming a short obtuse mentum, rugose dorsally. Petals 7–11 mm. long and 3–5 mm. broad, elliptic-ovate to rhombic-obovate, acute. Lip 11–14 mm. long and 4–6 mm. broad, oblong-pandurate, angled or dentate-lobed above the middle, terminal part of the lip reflexed, lanceolate, base of lip forming a shallow didymous spur.

Mexico, Guatemala, Honduras and Panama.

CHIRIQUÍ: "Chiriquí Cordilleren," alt. 1800 m., *Warscewicz.*

The Panamanian record is a specimen cited by Reichenbach.

36. POLYSTACHYA Hook.

POLYSTACHYA Hook. Exot. Fl. 2: *t. 103.* 1825; Kränzlin in Fedde Rep. Sp. Nov. Beih. 39:1–136. 1926.

Epiphytic or rarely terrestrial, caespitose, pseudobulbose (Panamanian species) herbs. Inflorescence a raceme or panicle. Dorsal sepal free. Lateral sepals larger than the dorsal, forming a mentum at their bases. Petals much smaller than the sepals, usually linear. Lip non-resupinate, nearly entire or usually 3-lobed; disc of the lip usually with a conspicuous callus and often covered with fragile, articulated or farinaceous cells. Column short, with a prominent foot; pollinia 4, or 4 joined into 2.

Kränzlin, in his monograph, lists 188 species of *Polystachya,* mostly African.

a. Ovary and rachis of the inflorescence glabrous..... 1. P. CEREA
aa. Ovary and rachis of the inflorescence pubescent..... 2. P. MASAYENSIS

1. POLYSTACHYA CEREA Lindl. in Bot. Reg. 26: Misc. p. 86. 1840.

Polystachya minor Fawc. & Rendle in Jour. Bot. 48:106. 1910.
Polystachya panamensis Schltr. in Fedde Rep. Sp. Nov. Beih. 17:49. 1922.
Polystachya costaricensis Schltr. loc. cit. 19:223. 1923.
Polystachya Powellii Ames, Sched. Orch. 7:31. 1924.

Caespitose, epiphytic herbs up to about 60 cm. tall, commonly 10–15 cm. tall. Stems very short, pseudobulbose; pseudobulbs ovoid to fusiform or cylindric, usually enclosed in bracts or the leaf-sheaths, bearing 2–5 leaves. Leaves 3–26

cm. long and 0.4–3 cm. broad, variable, linear to oblong-elliptic to oblanceolate, acute or obtuse, the sheaths enclosing the peduncle at the base. Inflorescence terminal, the peduncle covered with scarious sheaths, bearing a single terminal raceme or 1 or more short lateral racemes from the nodes of the peduncle. Dorsal sepal 3–3.5 mm. long and 1.6–2 mm. broad, lanceolate, ovate to oblong-ovate, acute. Lateral sepals 3–4.5 mm. long and 1.5–3 mm. broad, lanceolate-ovate to broadly ovate, acute or acuminate. Petals 2–2.5 mm. long and 0.5–1 mm. broad, obtuse or acute, slightly arcuate. Lip 2.5–3.5 mm. long and 2–3 mm. broad, oblong or oblong-ovate, 3-lobed; lateral lobes small, usually rounded, erect; mid-lobe large, truncate, apiculate or usually retuse; disc provided with an umbonate or mammillate callus at the base and with the terminal part covered with evanescent, farinaceous pubescence. Ovary glabrous.

Mexico, Central America, the West Indies, tropical South America.

CANAL ZONE: hills east of Panamá City, *Powell 122, 3426;* Barro Colorado Island, *Shattuck 228.* CHIRIQUÍ: opposite Lino, alt. 1200 m., *Powell 343.* COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 781, 1171.* PANAMÁ: Haicenda La Joya, alt. 50–300 m., *Dodge et al 16909;* Sabanas near Chepo, alt. 30 m., *Hunter & Allen 28.* PROVINCE NOT GIVEN: "hills," *Powell 122, 3439;* between Fort Clayton and Corozal, *Standley 29100.*

2. POLYSTACHYA MASAYENSIS Reichb. f. in Bonplandia 3:217. 1855.

Similar to *Polystachya cerea* Lindl. but usually somewhat smaller in size, vegetatively, and with the rachis of the inflorescence and the ovary downy-pubescent.

Mexico, Nicaragua, Costa Rica and Panama.

CANAL ZONE: Chagres, *Fendler 334.* COCLÉ: hills north of El Valle de Antón, alt. 1000 m., *Allen 2319;* Río Antón, alt. 500 m., *Hunter & Allen 380.* COLÓN: Cativa-Porto Bello trail, alt. sea-level, *Powell 366.*

Perhaps best treated as a mere variety of *P. cerea* Lindl.

37. GALEANDRA Lindl.

GALEANDRA Lindl. in Lindl. & Bauer, Illustr. Orch. Pl., Gen. *t. 8.* 1832.

Terrestrial or epiphytic herbs. Stems leafy, becoming thickened and pseudobulbose. Leaves distichous, plicate. Sepals free, equal, spreading. Petals similar to the sepals, sometimes broader. Lip entire or bilobed, adnate to the base of the column, with a conspicuous spur at the base; lateral lobes usually erect and enfolded over the column. Column erect, short; anther terminal, operculate, incumbent, imperfectly 2-celled; pollinia 4, ceraceous, often in pairs.

There are 3 species of *Galeandra* in Mexico and Central America, 2 of which occur in Panama—About 20 species in South America.

a. Plants epiphytic; lip large, with spur 4–5 cm. long ..... 1. G. BAUERI
aa. Plants terrestrial; lip about 2 cm. long ..... 2. G. JUNCEA

1. GALEANDRA BAUERI Lindl. in Lindl. & Bauer, Illustr. Orch. Pl., Gen. *t. 8.* 1832; Batem. Orch. Mex. & Guat. *t. 19.* 1840; Lindl. in Bot. Reg. 26: *t. 49.* 1840; L. Wms. in Ann. Missouri Bot. Gard. 26:284. 1939.

Galeandra Batemanii Rolfe in Gard. Chron. III, 12:431. 1892.

Fig. 146. *Polystachya masayensis*

Fig. 147. *Galeandra Baueri*

Caespitose, epiphytic herbs up to about 50 cm. tall. Stems pseudobulbose, fusiform to ovoid, covered with the leaf-sheaths or becoming naked, bearing up to about 8 leaves. Leaves 8–26 cm. long and 0.8–2 cm. broad, linear-elliptic to elliptic, acute or acuminate, plicate. Inflorescence a terminal few-flowered raceme; flowers relatively large and pretty. Dorsal sepal 15–19 mm. long and 3–5 mm. broad, oblanceolate, acute. Lateral sepals 16–20 mm. long and 4–6 mm. broad, lanceolate or elliptic-lanceolate, acute, slightly arcuate. Petals 16–20 mm. long and 4–6 mm. broad, elliptic to elliptic-oblanceolate, acute. Lip, including the spur, 40–50 mm. long and 30–40 mm. broad, infundibuliform, spur just about equalling the lamina in length; lamina suborbicular-rhombic, emarginate.

Mexico, British Honduras, Guatemala, Honduras, Panama and French Guiana. A variety in Peru.

BOCAS DEL TORO: in swamp near Almirante, *Nash 1962;* Shepherd Island, vicinity of Chiriquí Lagoon, *Wedel 2712.*

2. GALEANDRA JUNCEA Lindl. Sert. Orch. sub. *t. 37.* 1840; Cogn. in Mart. Fl. Bras. 3[4]:306. 1895.

Strict terrestrial herbs up to about 50 cm. tall. Stems pseudobulbose, the pseudobulbs 1.5–2 cm. long, borne on the surface or just under the surface of the ground, simple, invested by the leaf-sheaths. Leaves up to about 20 cm. long and 0.5 cm. broad, ensiform, conduplicate. Inflorescence a simple (or branched?) few-flowered raceme. Sepals about 13 mm. long and 3.5–4 mm. broad, lanceolate, acute. Petals about 12 mm. long and 3.5 mm. broad, oblanceolate, acute. Lip 17–20 mm. long and about 16 mm. broad, obscurely trilobate, spurred; lamina when expanded broadly ovate in outline, with 2 small lamellate, pubescent calluses near the middle, and toward the apex a dense patch of pilose pubescence arranged in three lines; spur short, about 5 mm. long, directed outward and backward.

Panama, Venezuela, the Guianas and Brazil.

PANAMÁ: Isla Taboga, alt. 0–350 m., *Allen 1268;* Taboga Island, *Cheeseman 483.*

The description is drawn from the Panamanian material cited.

38. EPIDANTHUS L. Wms.

EPIDANTHUS L. Wms. in Bot. Mus. Leafl. Harv. Univ. 8:148. 1940.

Small, simple or branched, epiphytic herbs with slender, leafy, repent or caespitose stems lacking pseudobulbs. Leaves distichous, jointed at the base, plane or terete, linear or subfiliform; leaf-sheaths persistent on the stem. Inflorescence a terminal, distichous, fractiflex raceme. Sepals similar, free, reflexed or spreading. Petals narrower than the sepals, with a callus at the base. Lip simple or 3-lobed, adnate to the base of the column. Column short, terete, adnate to the lip or callus of the lip for its entire length; anther terminal, incumbent; pollinia 2, ceraceous.

A small Mexican and Central American genus of three species, only one of

which is known from Panama. It has been confused with *Epidendrum*, with which it has little affinity.

1. Epidanthus paranthicus (Reichb. f.) L. Wms. in Bot. Mus. Leafl. Harv. Univ. 8:150. 1940.

Epidendrum paranthicum Reichb. f. in Bot. Zeit. 10:732. 1852.
Epidendrum Sancti Ramoni Kränzl. in Vierteljahrschr. Naturforsch. Zürich 74:137. 1929.

Small, caespitose, epiphytic herbs up to 30 cm. tall. Stems slender, slightly fractiflex. Leaves 0.8–2.5 cm. long and 0.05–0.2 cm. broad, linear, semi-terete, obtuse, deciduous. Inflorescence a terminal, fractiflex, few- to several-flowered raceme; flowers small, white or yellow. Sepals similar, 2–3 mm. long and 1–1.5 mm. broad, lanceolate to ovate-lanceolate, acute, the laterals often slightly cucullate. Petals 2–2.5 cm. long and about 0.5 mm. broad, linear-lanceolate, acute. Lip 2.2–3 mm. long and 2–2.5 mm. broad, unguiculate; the claw adnate to the column; lamina cordate-orbicular to reniform, long-apiculate.

Mexico, Guatemala, Honduras, Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, Boquete District, alt. 1800 m., *Davidson 121*.

(To be continued in Part III, Fascicle 4)

FLORA OF PANAMA

Part III. Fascicle 4

ORCHIDACEAE[1]

By PAUL H. ALLEN

39. CALANTHE R. Br.

CALANTHE R. Br. in Bot. Reg. 7: sub *t. 573.* 1821; Lindl. Gen. & Spec. Orch. Pl. 249. 1833; Benth. & Hook. Gen. Pl. 3:520. 1883.

Ghiesbreghtia A. Rich. & Gal. Ann. Sci. Nat. III, 3:28. 1845.

Erect terrestrial, or rarely epiphytic herbs, with leafy or sometimes pseudobulbous stems. Leaves few, broadly plicate, with prominent veins. In some of the Old World species the sheathing bases of the leaves envelop the angulate pseudobulbs, the leaf blades becoming deciduous at the end of the season's growth, while in other species the leaves persist for more than one year, with the pseudobulbs much reduced in size or entirely absent. In the single species known to occur in Panama, the two broadly plicate leaves are contracted below into a sheathing petiole arising directly from the rhizome and without any enclosed pseudobulb. Inflorescences erect, many-flowered racemes, equaling or exceeding the leaves in length, the basal portions enveloped by the sheathing leaf bases. Flowers small, on slender pedicels, subtended by linear bracts. Sepals free, subequal, spreading. Petals similar to the sepals or smaller. Lip 3-lobed, prolonged at the base into a spur, the claw of the lip connate to the column. Column short, erect, broadly winged at the apex, the base without a foot. Anther subterminal, operculate, incumbent, 2-celled; pollinia 8, waxy, elongate-pyriform, in groups of 4 in each cell of the anther.

A large genus of the Old World tropics, widely distributed in Africa, Asia and Oceania, with a single species in Central America and the West Indies.

[1]It is particularly desired to acknowledge the cooperation of Professor Oakes Ames of the Botanical Museum of Harvard University in affording the writer the unrestricted use of the Ames Orchid Herbarium and Library. The excellent illustrations by Mrs. Blanche Ames and by Mr. Gordon W. Dillon, used throughout the text, would not have been available without Professor Ames' permission. It is also desired to mention the active cooperation of Dr. Louis O. Williams in providing prompt determinations during the long period of field work in Panama, and, more recently, the very generous help of Mr. Charles Schweinfurth in the solving of many of the critical problems in the course of the preparation of the manuscript.

Issued March 21, 1949.

Fig. 148. *Calanthe mexicana*

1. CALANTHE MEXICANA Rchb. f. in Linnaea 18:406. 1844; Xenia Orch. 1:205, *t. 79, figs. 1–3.* 1856.

Ghiesbreghtia calanthoides A. Rich. & Gal. in Ann. Sci. Nat. III, 3:28. 1845.
Ghiesbreghtia mexicana A. Rich. & Gal. ex Rchb. f. Xenia Orch. 1:205. 1856, in synon.

Erect terrestrial herbs, 25–70 cm. tall. Leaves 2, broadly oblong-elliptic, acute, rather thinly plicate, 30–70 cm. long and 3–14 cm. broad, contracted at the base into a sheathing petiole, arising directly from the rhizome, the basal portions enclosed in 2–3 thin leafless bracts. Inflorescence an erect raceme equaling or exceeding the leaves in length, produced from between the sheathing leaf bases. Flowers few to many, small, white, pedicellate, subtended by linear acuminate bracts 8–20 mm. long and 1–2 mm. broad. Sepals white, free, subequal, spreading, ovate, acute, 7–10 mm. long and 3–6 mm. broad. Petals white, free, spreading, obovate-lanceolate, obtuse, 5–6 mm. long and 2–3 mm. wide. Lip 3-lobed, 8–10 mm. long, prolonged at the base into a spur; lateral lobes erect, minutely puberulent, the upper margins parallel with the column; frontal lobe spreading, yellow, minutely puberulent, subrotund, shortly apiculate, 3–4 mm. long. Ovary puberulent. Capsule ellipsoidal, 2.5–3 cm. long and 1–2 cm. wide.[1]

Mexico, Guatemala, Costa Rica, Panama, and the West Indies.

CHIRIQUÍ: Upper Río Chiriquí Viejo, about 5000–6000 ft., *Seibert 171;* vic. Casita Alta, Volcán de Chiriquí, 1500–2000 m., *Woodson, Allen & Seibert 825;* Finca Lérida to Peña Blanca, 1750–2000 m., *Woodson & Schery 303;* ridges south of Finca Lérida to Loma Sardina, 6000–7000 ft., *Allen 4758;* rain forest, Volcán de Chiriquí, 8000 ft., *Davidson 934;* Bajo Chorro, 7500 ft., *Davidson 203;* Cerro Punta, 2000–2500 m., *Allen & Fairchild 3517.*

A frequent and attractive terrestrial species in the bamboo-oak zone of the upper slopes of Chiriquí Volcano.

40. BLETIA Ruiz & Pavon

BLETIA Ruiz & Pavon, Fl. Peruv. & Chil. Prodr. 119, *t. 26.* 1794; Benth. & Hook. Gen. Pl. 3:513. 1883.

Gyas Salisb. in Trans. Hort. Soc. Lond. 1:299. 1812.
Bletiana Raf. in Amer. Monthly Mag. 4^2:268. 1818, nomen.
Thiebautia Colla, Hort. Ripul. 139. 1824.
Jimensia Raf. Fl. Tellur. 4:38. 1836.
Regnellia Barb. Rodr. Gen. et Spec. Orch. Nov. 1:81. 1877.
Bletilla Rchb. f. in Fl. des Serres 8:246. 1853.

Erect terrestrial herbs, with a few long, lanceolate, plicate, ultimately deciduous leaves which are contracted at the base into a sheathing petiole arising from the apex of a subglobose or sometimes more or less flattened, corm-like pseudobulb considerably resembling that of a Gladiolus. Inflorescences slender, erect, leafless scapes, equaling or exceeding the leaves in length, the basal portion either pro-

[1]Since all measurements have been taken from dried material, it is to be expected that fresh flowers will exceed these figures by at least a third.

duced from the sides of the corm or enveloped in the sheathing leaf bases, the upper portion racemose or sometimes paniculate. Flowers of moderate size or small. Sepals free, subequal, spreading. Petals subequal to the sepals but usually broader. Lip entire or 3-lobed; the lateral lobes broad, usually rounded, erect, in natural position parallel to the column, or sometimes with lobulate, spreading apices; mid-lobe of the lip spreading, with or without an isthmus, the apex often crisped and reflexed, retuse or 2-lobed; the disk with 5–7 more or less fleshy, longitudinal crests or keels. Column elongate, semi-terete, arcuate, the apex winged and the base auriculate. Anther operculate, incumbent, 2-celled; pollinia 8, waxy, flattened, obovate or roughly triangular in outline.

A seemingly natural but perplexing genus in need of revision, now embracing about 50 species distributed from Florida and the West Indies to Mexico and Central and South America as far as Argentina, with three or four species described from the Old World tropics. It seems probable that careful comparison of available material would reduce this list to about a dozen valid species, some of which evidently are widely distributed.

a. Inflorescence enveloped by the sheathing leaf bases. Flowers about 3 cm. long, produced during the rainy season (summer). Highland species..... 2. B. REFLEXA

aa. Inflorescence not enveloped by the sheathing leaf bases. Flowers about 1.5 cm. long, produced during the dry season (winter). Lowland species..... 1. B. PURPUREA

1. BLETIA PURPUREA (Lam.) DC. in Mem. Soc. Phys. Hist. Nat. Genève 9:97, 100. 1841; Huit. Not. Pl. Rar. 23. 1841.

Limodorum purpureum Lam. Encycl. Meth. Bot. 3:515. 1791.
Limodorum verecundum Salisb. Prodr. Stirp. 9. 1796.
Bletia verecunda R. Br. in Ait. Hort. Kew. ed. 2, 5:206. 1813.
Bletia pallida Loddiges, Bot. Cab. 7: *t. 629*. 1822.

Erect terrestrial herbs with 1–4 lanceolate, acuminate, ultimately deciduous leaves 30–70 cm. long and 0.6–4.8 cm. wide, which are contracted below into a sheathing petiole arising from a subglobose or flattened corm-like pseudobulb 2.5–3 cm. in diameter. Inflorescence a slender, erect raceme or panicle, the degree of development depending on the strength of the individual plant, the scape produced from the side of the corm and equaling or exceeding the leaves in length, sometimes flowering after the leaves have fallen. Flowers few to many, rosy purple. Sepals free, subequal, spreading, 1.6–1.8 cm. long and .6–.7 cm. wide, the dorsal sepal ovate-lanceolate, acute, the laterals somewhat oblique at the base, ovate, acute. Petals subequal to the sepals, 1.5–1.7 cm. long and .6–.7 cm. broad, obovate, acute. Lip 3-lobed, about equaling the petals in length, the lateral lobes erect and paralleling the column in natural position, the frontal lobe extended, spreading, more or less crisped and reflexed, the apex bilobed, the inner lip with 7 erect, yellow, parallel, longitudinal, fleshy keels, only 5 of which extend to the frontal lobe. Column slender, arcuate, the apex winged, the base auriculate.

Fig. 149. *Bletia purpurea*

Mexico, Guatemala, British Honduras, Honduras, Costa Rica, Panama, Colombia, Venezuela, and the West Indies.

PANAMÁ: foothills east of Panama City, sea level, *Powell 45;* vic. San Carlos, on walls of river canyons, 0–10 m., *Allen 1149;* along Río Tecúmen, north of Chepo road, about 30 m., *Hunter & Allen 214;* Perlas Archipelago, San José Island, sea cliffs at East Bay, *Johnston 567;* Icaco Island, top of large rocks near coast, *Johnston 922.* COCLÉ: El Valle, banks of Río Antón, 600 m., *Allen 2766;* Río Mata Ahogado, region southeast of El Valle, 200 m., *Allen 3820;* vic. El Valle, *White & White 69.*

A very common and attractive species of the lowlands of the dry Pacific slope, where it is found from sea level to about 3000 ft. elevation, being frequently seen on the nearly vertical walls of the river canyons and in rocky places. The relatively small but brightly colored flowers are produced during the dry season (winter) after the corms have matured and usually after the leaves have fallen.

2. BLETIA REFLEXA Lindl. in Bot. Reg. 21: *t. 1760.* 1835.[1]

Limodorum Lankesteri Ames & Schweinf. in Sched. Orch. 10:78. 1930.
Bletia Lankesteri Ames, Hub. & Schweinf. in Bot. Mus. Leaf. Harv. Univ. 3:41. 1934.

Erect terrestrial herbs with 2–3, usually linear-lanceolate, acuminate, plicate, strongly veined leaves which are ultimately deciduous. Leaves 25–60 cm. long and 0.8–2.5 cm. wide, the basal portions contracted into a sheathing petiole enveloped in 2–3 short, tubular, leafless bracts which are produced from the apex of a short, subconic, corm-like pseudobulb averaging about 1.5 cm. in diameter. Inflorescences erect, the basal portions enclosed in the sheathing leaf bases, the terminal portion an unbranched raceme equaling or exceeding the leaves in length. Flowers relatively large and conspicuous, in our specimens described as being purplish rose, produced on slender pedicels subtended by ovate, acuminate bracts. Sepals free, spreading, subequal, lanceolate, acute, 3–3.2 cm. long and .7–.9 cm. wide, the dorsal usually somewhat narrower. Petals subequal to the dorsal sepal, oblanceolate, acute, 3–3.5 cm. long and about .7 cm. wide. Lip 3-lobed, about 3 cm. long and 2–2.2 cm. wide when spread out, the lateral lobes rounded, erect in natural position, the mid-lobe entire, obtuse, spreading, about 8 mm. long and 8 mm. wide. Inner lip (disk) with 5 fleshy longitudinal crests. Column slender, semi-terete, 2.3–3 cm. long, somewhat dilated at the apex.

Mexico, Guatemala, Costa Rica, and Panama.

CHIRIQUÍ: Llanos del Volcán, 1120–1200 m., *Seibert 328.*

[1] It seems possible that this species may be that originally described as *Bletia campanulata* Llave & Lex. (in Nov. Veg. Descr. Fasc. 2:17. 1825), but the description as given is obscure, and seemingly the type no longer exists. The present material shows rather marked differences from the 'Botanical Register' plate of *Bletia reflexa*, particularly in the shorter central lobe. However, since *Bletia Lankesteri* is about intermediate in this character between our specimens and the typical *Bletia reflexa*, it seems likely that both represent local forms of a widely distributed, somewhat polymorphic species.

41. CHYSIS Lindl.

CHYSIS Lindl. in Bot. Reg. 23: *t. 1937*. 1837; Benth. & Hook. Gen. Pl. 3:514. 1883.

Thorvaldsenia Liebm. in Bot. Not. 103. 1844.

Epiphytic herbs with fleshy, fusiform or clavate, often more or less pendent, pseudobulbous stems. Leaves broadly plicate, the sheathing bases enveloping the pseudobulbs, the leaf blades becoming deciduous at the end of the current season's growth. Inflorescences usually solitary, produced from the axils of one of the lower bracts of the flush of leafy new growth, the scape terminating above in a short, few-flowered raceme. Flowers relatively large and conspicuous. Sepals subequal, free, spreading, the dorsal sepal erect, the broader lateral sepals oblique and adnate to the foot of the column. Petals free, subequal to the sepals, but usually narrower. Lip fleshy, 3-lobed, the lateral lobes rounded or falcate, erect in natural position, or converging over the column, the mid-lobe erect or reflexed, often more or less 2-lobed or emarginate; disk with 3 to 5 longitudinal fleshy crests. Column short, erect, arcuate, broadly winged or roughly triangular in cross-section, produced at the base into a foot. Anther subrotund, operculate, incumbent; pollinia 8, waxy, oblong-ovoid, 4 in each cell of the anther.

Examination of available material in the Ames Herbarium and the Herbarium of the Missouri Botanical Garden would indicate that the genus is probably limited to two somewhat variable species differing fundamentally in the number of fleshy crests of the disk and in the frontal margin of the mid-lobe of the lip. The known geographic range is from Mexico to Peru and Venezuela. A small-flowered, richly colored variety of one of these species is known in Panama from a single collection of flowering material made by Mr. C. W. Powell. Although a few subsequent, sterile specimens have been seen in the field by the writer, it is to be considered as one of the local rarities.

1. CHYSIS AUREA Lindl. var. MACULATA Hook. in Bot. Mag. *t. 4576*. 1851.

Epiphytic herbs, with fleshy cylindric, fusiform or clavate, pendent pseudobulbs 15–20 cm. long and 1–2 cm. wide. Leaves plicate, lanceolate, acute or acuminate, 6–40 cm. long and 1.2–3.5 cm. wide, the imbricating bases persistent, enclosing the pseudobulbs, the blades ultimately deciduous. Inflorescences usually solitary, short racemes produced from the axils of one of the bracts of the leafy new growth. Flowers 3–7, 2.5–3 cm. long in dried specimens but probably somewhat larger when fresh. Dorsal sepal free, erect, elliptic-oblong, obtuse, 2–2.2 cm. long and 1.2–1.5 cm. wide, lateral sepals obliquely cuneate, 2.2–2.5 cm. long and 1.6–1.8 cm. broad, connate at the base and adnate to the column foot, form-

Fig. 150. *Chysis aurea* var. *maculata*

ing a rounded mentum. Petals obovate-lanceolate, acute, 2–2.2 cm. long and 0.9–1.1 cm. broad. Lip 3-lobed, the lateral lobes subfalcate, obtuse, erect, the apices somewhat convergent, the mid-lobe rounded in general outline, more or less cymbiform, the apex 2-lobed or emarginate; disk with 5 fleshy, longitudinal crests. Column short, stout, broadly winged, 0.9–1.0 cm. long and 0.9–1.0 cm. broad at the base, which is produced into a foot.

Costa Rica, Panama, and Colombia.

PANAMÁ: near Arraiján, west of the Canal, about sea level, *Powell 309*.

Chysis aurea var. *maculata* differs from the type in the smaller, more richly colored flowers. The sepals and petals are described as tan, often shaded purple. Lip yellow, the mid-lobe purple, with paler markings.

42. BULBOPHYLLUM Thou.

Bulbophyllum du Petit-Thouars, Hist. Pl. Orch. Iles Aust. d'Afr., Tabl. des Espèc. III, *t. 93–110*. 1822; Benth. & Hook. Gen. Pl. 3:501. 1883.

Didactyle Lindl. in Fol. Orch. 1:57. 1852.
Bolbophyllaria Rchb. f. in Bot. Zeit. 10:934. 1852.

Epiphytic herbs, with short, subconic or angulate, 1- to 2-leaved pseudobulbs often widely spaced along a creeping rhizome. Inflorescences erect or arching spikes or racemes produced from the base of the pseudobulbs. Flowers numerous, inconspicuous, subtended by a bract, free on short pedicels or sessile in shallow pits on the fleshy peduncle. Sepals free, or the laterals connate and obliquely dilated at the base, adnate to the foot of the column. Petals smaller than the sepals, with entire or ciliate margins. Lip simple, fleshy, or with a thickened basal callus, contracted at the base and hinged to the column foot. Column short, erect, produced at the base into a foot. Anther terminal, operculate, incumbent, depressed-hemispherical or obtusely conical, usually 2 celled; pollinia normally 4, waxy, in pairs in the cells of the anther.

There is an extensive list of additional generic synonyms which are not cited because they apply to Old World members of the genus. Since nearly the entire genus is of Old World tropical distribution, where it attains a polymorphic development similar to that of *Epidendrum* in the Americas, it seems futile to attempt a generic description here which will cover the maximum possible limits of floral and vegetative structure. The few species found in the American tropics bear little resemblance to their Old World relatives, and might, for all practical purposes, be separated; but in this case, as in many others, it seems best to follow established usage. The description as given here is intended only to cover the two Panama species, which are identical in superficial appearance, but differ markedly in the size and shape of the petals, and to a lesser extent in the size and form of the lip.

a. Petals acuminate to aristate, exceeding the length of the column; nearly equaling the sepals..... 1. B. ARISTATUM

aa. Petals obtuse, scarcely equaling the length of the column, less than half the length of the sepals..... 2. B. PACHYRRHACHIS

1. BULBOPHYLLUM ARISTATUM (Rchb. f.) Hemsl. Biol. Centr.-Amer. Bot. 3:213. 1883.

Bolbophyllaria aristata Rchb. f. Beitr. Orch. Centr.-Amer. 60. 1861.

Epiphytic herbs 10–35 cm. tall, with short, subpyramidal, angulate pseudobulbs 2.5–5 cm. long and 1–2 cm. wide, usually spaced at intervals along the creeping rhizome. Leaves 2, linear-lanceolate, acute, coriaceous, 6–25 cm. long and 1.5–3 cm. wide. Inflorescences erect racemes 10–40 cm. tall, from the base of the pseudobulbs. Flowers inconspicuous, nearly sessile, subtended by a bract which nearly equals the flower in length. Dorsal sepal free, concave, ovate, acuminate, papillose on the outer surface, 5–6 mm. long and 1.5–2 mm. wide, lateral sepals ovate, acuminate, papillose on the outer surfaces, 4–5 mm. long and 1.5–2 mm. broad, connate at the base and adnate to the foot of the column. Petals lanceolate, acuminate to aristate, 4–7 mm. long and 1.5–3 mm. wide. Lip very fleshy, entire, obtuse, linguiform, 2 mm. long and 1–1.5 mm. wide, hinged to the column foot. Column very short, 1.5–2 mm. long, with two apical, lateral, denticulate processes, the base produced into a foot.

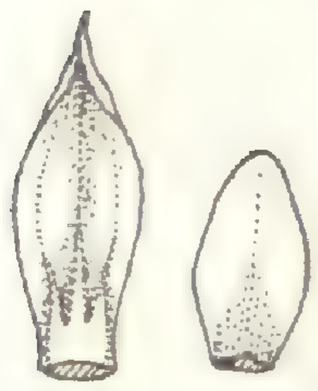


Fig. 151. *Bulbophyllum* petals: 1, of *B. aristatum*, 2, of *B. pachyrrhachis*

Mexico, Guatemala, Honduras, Costa Rica, and Panama.

PANAMÁ: foothills east of city, sea level, *Powell s. n.;* San Juan Range, sea level, *Powell 3492.* COCLÉ: south rim of El Valle de Antón, 650 m., *Allen 2915;* El Valle, lower valley and marshes along Río Antón, about 500 m., *Hunter & Allen 375.* CHIRIQUÍ: Jaramillo, 4500 ft., *Davidson 1270.*

2. BULBOPHYLLUM PACHYRRHACHIS (Rchb. f.) Griseb. Fl. Brit. W. Indies, p. 613. 1864 *(as Bolbophyllum prachyrrhachis).*

Bolbophyllaria pachyrrhachis Rchb. f. in Walp. Ann. 6:241. 1861.
Bulbophyllum vinosum Schltr. Beih. Bot. Centralbl. 36^2:411. 1918.

Epiphytic herbs 10–45 cm. tall, with short, subconical, strongly 4-angulate pseudobulbs relatively widely spaced along a creeping rhizome. Leaves 2, linear-lanceolate, acute or acuminate, 7–20 cm. long and 0.8–2.4 cm. wide. Inflorescence erect or arching from the base of the pseudobulbs, 10–45 cm. tall, the apical flowering portion of the peduncle often fleshy. Flowers small and inconspicuous, sessile in shallow pits on the peduncle, subtended by broadly triangular bracts. Dorsal sepal free, concave, ovate-acute, 4–5 mm. long and arching over the column, the laterals ovate-acuminate, 4 mm. long and 1.5 mm. broad, connate at the base and adnate to the foot of the column. Petals scarcely equaling the column and less than ⅓ the length of the sepals, oblong-elliptic, obtuse. Lip entire, very

Fig. 152. *Bulbophyllum pachyrrhachis*

fleshy, more or less 3-angled in cross-section, linguiform, the apex obtuse, contracted at the base, and articulated to the column foot.

Mexico, Guatemala, Honduras, Costa Rica, Panama, and the West Indies.

CANAL ZONE: near Frijoles, sea level, *Powell 364;* along Las Cruces trail, between Ft. Clayton and Corozal, *Standley 29102;* foothills east of city, sea level, *Powell s.n.* PANAMÁ: drowned forest of Quebrada Ancha, Madden Lake region, 70 m., *Steyermark & Allen 17104.* VERAGUAS: Río de Jesús, sea level, *Allen 4243.*

43. EULOPHIA R. Br.

EULOPHIA R. Br. in Bot. Reg. 8: *t. 686.* 1823; Benth. & Hook. Gen. Pl. 3:535. 1883.

Cyrtopera Lindl. in Wallich, Numer. List, n. 7362–64. 1832; Gen. & Sp. Orch. Pl. 189. 1833.

Erect, terrestrial herbs with lanceolate, plicate, ultimately deciduous leaves, the basal portions contracted into a sheathing petiole arising from the apex of the short, subconical, tuber-like pseudobulb. Inflorescence an erect, leafless raceme, produced from the base of the tuber-like pseudobulb, equaling or exceeding the leaves. Flowers few to many. Sepals free, subequal, the laterals adnate to the foot of the column. Petals subequal to the sepals, but narrower. Lip 3-lobed, the rounded, lateral lobes erect and converging over the column, the mid-lobe erect or recurved, sometimes 2-lobed, base of the lip produced into a saccate mentum continuous with the foot of the column. Column short, produced at the base into a foot. Anther terminal, operculate, incumbent. Pollinia 2–4, waxy.

A large genus of mainly Asiatic and African plants represented in Panama by a single species. There seems no point in citing here the extensive list of generic synonyms applicable only to the Old World plants.

1. EULOPHIA ALTA (L.) Fawc. & Rendle, Fl. Jam. 1:112, *t. 22, figs. 4–8.* 1910.

Limodorum altum L. Syst. ed. 12, 2:594. 1767.
Dendrobium longifolium HBK. Nov. Gen. et Sp. 1:360. 1815.
Cyrtopodium Woodfordii Sims, in Bot. Mag. *t. 1814.* 1816.
Cyrtopera Woodfordii Lindley, Gen. & Sp. Orch. Pl. 189. 1833.
Cyrtopera longifolia Rchb. f. in Walp. Ann. 6:668. 1861.
Eulophia Woodfordii Rolfe, in Fl. Trop. Afr. 7:68. 1897.
Eulophia longifolia (HBK.) Schltr. Die Orchideen, p. 347. 1914.

Erect terrestrial herbs with thickened, tuberous rhizomes usually made up of roughly triangular, subconic, corm-like annual sections. Leaves several, erect, lanceolate, acuminate, plicate, strongly veined, ultimately deciduous, 60–120 cm. long and 2–10 cm. wide, contracted below into a cylindric leafy petiole, the broad bases enveloping the corm-like pseudobulb. Inflorescences erect, lateral, leafless scapes, produced from the base of the corm, terminating in a raceme 70–100 cm. tall. Flowers many, of moderate size. Sepals free, erect, subequal, lanceolate to oblanceolate, acute, 2–2.5 cm. long and 0.7–0.8 cm. wide, the laterals adnate at

Fig. 153. *Eulophia alta*

the base to the column foot. Petals erect, oblong, obtuse, subequal to the sepals, 1.5–1.7 cm. long and 0.7–0.8 cm. broad. Lip 3-lobed, lateral lobes rounded, erect, the apices spreading, mid-lobe entire, usually reflexed, with numerous minutely denticulate longitudinal nerves; disk with 2 erect, alate processes, the base sub-saccate, forming a rounded mentum with the foot of the column. Column winged, arcuate, 0.8–1.0 cm. long, produced at the base into a foot.

Florida, Mexico, British Honduras, Guatemala, Panama, the West Indies, Colombia, Venezuela, Peru, and Brazil.

PANAMÁ: Mata Redonda, sea level, *Powell 3442;* hills and valleys east of city, sea level, *Powell 10;* vic. La Chorrera, sea level, *Allen 2080.* COCLÉ: vic. El Valle de Antón, 600 m., *Allen 1988.*

Rather frequent terrestrial plants found in areas of wet savanna and along roadways, sometimes persisting in vacant lots in Panama City. The leaves are reminiscent of those of *Bletia* or *Peristeria.* The sepals and petals are green or greenish tan, the lip variously shaded with rose or purple.

43-A. CYRTOPODIUM R. Br.[1]

CYRTOPODIUM R. Br. in Ait. Hort. Kew., ed. 2, 5:216. 1813; Benth. & Hook. Gen. Pl. 3:541. 1883.

Tylochilus Nees in Verh. Bot. Gart. Berlin 8:194, *t. 3.* 1832.

Epiphytic or semi-terrestrial herbs with stout, cylindric or fusiform pseudobulbs. Leaves broadly plicate, strongly veined, more or less distichous, the imbricating bases enclosing the pseudobulb, the blades ultimately deciduous. Inflorescences erect, leafless scapes from the base of the pseudobulbs, racemose or paniculate, equaling or exceeding the leaves. Sepals subequal, free, spreading, the laterals often broader and more or less adnate to the foot of the column. Petals subequal to the sepals but usually broader. Lip 3-lobed, the laterals rounded, erect, parallel with the column or the apices spreading, the mid-lobe entire, retuse or crisped, with a fleshy basal crest, the base adnate to the column foot. Column short, subterete, arcuate, produced at the base into a foot. Anther operculate, imperfectly 2-celled; pollinia 2–4, waxy.

A small genus of American orchids represented in Panama by a single species.

1. CYRTOPODIUM PUNCTATUM (L.) Lindl. Gen. & Spec. Orch. Pl. 188. 1833.

Epidendrum punctatum L. Syst. Nat. 2:1246. 1760.
Cymbidium trinerve Meyer, Prim. Fl. Essequeb. 258. 1818.
Epidendrum gigas Velloso, Fl. Flum. Ic. 9: *t. 20.* 1827.
Cyrtopodium Willmorei Knowles & Westcott, Fl. Cab. 1: *t. 4.* 1837.
Oncidium palmophilum Mart. Herb. ex Lindl. Sert. Orch. sub *t. 12.* 1838.
Cyrtopodium speciosissimum Hort. ex Du Buysson, L' Orchid. 299. 1878.
Cyrtopodium tigrinum Linden, Ill. Hort. 28:95. 1881, nomen tantum.
Cyrtopodium Saintlegerianum Rchb. f. in Flora 68:301. 1885.
Cyrtopodium punctatum var. *Saintlegerianum* Hort. in Stein's Orchideenbuch, p. 181. 1892.

[1] The genus *Cyrtopodium* was unrecorded from Panama when the generic key was written.

Fig. 154. *Cyrtopodium punctatum*

Robust, epiphytic or semi-terrestrial herbs with stout, fusiform pseudobulbs 12–40 cm. long and 2–6 cm. wide, the old pseudobulbs naked or enclosed in the imbricating, persistent leaf bases which are armed at the apex with stout, sharp spines. Leaves linear-lanceolate, acute or acuminate, plicate, distichous, strongly veined, 30–120 cm. long and 2–7.5 cm. wide. Inflorescence a lateral leafless panicle from the base of the pseudobulb, 60–120 cm. tall, the bracts oblong-lanceolate, with undulate margins, resembling the sepals in color and markings. Flowers many. Sepals free, subequal, spreading, oblong-lanceolate, acute or apiculate with strongly undulate margins, greenish yellow spotted irregularly with reddish brown. Dorsal sepal 0.8–2.5 cm. long and 0.8–1.1 cm. wide, lateral sepals 1.5–2 cm. long and 0.7–1.0 cm. wide. Petals free, spreading, obovate, obtuse or apiculate, yellow irregularly spotted red-brown, 1.5–2.0 cm. long and 0.9–1.2 cm. wide. Lip 3-lobed, the lateral lobes erect, more or less convergent over the column, rounded, usually exceeding the mid-lobe in size, reddish-brown shading to yellow at the base, mid-lobe strongly undulant, crisped, yellow, marked purple or reddish brown, crest tuberculate, verrucose, base of lip an oblong limb articulated with the column foot. Column short, arcuate, with a dorsal crest, dilated or semi-auriculate above, narrowed below, produced at the base into a foot.

Florida, Mexico, Guatemala, Costa Rica, the West Indies, Colombia, Venezuela, the Guianas, Brazil, Peru, Paraguay, and Argentina.

PANAMÁ: San José Island, Perlas Archipelago, sea level, *Walker s. n.* (under *Allen 3542*).

Mr. Walker describes the plants as forming colonies on rocks. Although widely distributed in the Americas this is the only known station for the species in Panama.

44. WARREA Lindl.

WARREA Lindl. in Bot. Reg. n. s. 6: Misc. 14. 1843; Benth. & Hook. Gen. Pl. 3:545. 1883.

Erect, terrestrial, highland herbs with lanceolate, acute or acuminate, plicate, strongly veined leaves contracted at the base into a short, stout, sheathing petiole, either with or without an enclosed, short, cylindric, tapering pseudobulb. Inflorescence an erect, leafless raceme produced from the axil of the lowest basal, petiolar bract. Flowers relatively large and conspicuous. Sepals subequal, concave, the bases of the laterals oblique and adnate to the column foot. Petals subequal to the sepals but usually broader. Lip entire, the lateral margins erect; apex spreading, emarginate, 2-lobed, obscurely apiculate or entire; disk lamellate; base of the lip adnate to the column foot. Column elongate, semiterete, with a short basal foot. Anther terminal, operculate, incumbent; pollinia 2 to 4, broadly semiglobose, waxy.

A small, poorly understood genus of American terrestrial orchids at present including about six described species and several varieties ranging from Costa Rica to Colombia, Venezuela, Brazil, and Peru. A single species is known to occur in Panama in the highlands of Chiriquí Province.

1. WARREA COSTARICENSIS Schltr. in Fedde Rep. Sp. Nov. 16:446. 1920.

Erect terrestrial herbs to 70 cm. tall. Leaves 25–60 cm. long and 4–7.5 cm. broad, contracted at the base into a short, stout, sheathing petiole. Inflorescences erect racemes, equaling or slightly exceeding the leaves, produced from the sheathing base of the leafy petiole. Flowers relatively large, reddish bronze, the lip lighter with reddish bronze markings. Dorsal sepal oblong-ovate, obtuse, concave, 3.2–3.5 cm. long and 1.5 cm. broad, lateral sepals subequal to the dorsal sepal, the bases oblique, forming a short rounded mentum with the foot of the column. Petals obovate, obtuse, oblique, 2.8–3 cm. long and 1.3–1.5 cm. wide. Lip entire, 2.5–3 cm. long, and 2.5–3 cm. wide, suborbicular when spread out; basal callus narrow, about 1.5 cm. long. Column slender, arcuate, 2.5 cm. long, produced at the base into a foot.

Costa Rica and Panama.

CHIRIQUÍ: Potrerillos, 3000 ft., *Kieswetter s. n.*; in heavy forest near Potrerillos, *Dunn s. n.*

The present specimens differ from typical material of *Warrea costaricensis* in the entire, not emarginate apex of the lip, and in other minor details. Schlechter's sketch, however, does not seem to agree entirly with his description, which is in some respects nearer to our plant. Since our specimens compare in general quite well with the Costa Rican material it is thought best to consider them as slight geographical variants of an identical species, at least pending more adequate collections upon which to base comparisons.

45. GOVENIA Lindl.

GOVENIA Lindl. in Lodd. Bot. Cab. 18: *t. 1709.* 1831; Benth. & Hook. Gen. Pl. 3:542. 1883.

Eucnemis Lindl. Gen. & Sp. Orch. Pl. 161. 1833.

Erect, terrestrial herbs, with 1 or 2 broadly plicate leaves, the basal portions forming a stout sheathing petiole and enclosing a short, stout, subconical tapering pseudobulb. Inflorescences erect, subcapitate or racemose, equaling or exceeding the leaves, the base enveloped by one of the leafless petiolar bracts. Flowers few to many, of small to medium size, borne on short or elongate pedicels, subtended by short or elongate bracts. Sepals subequal, connivent at the base, the dorsal sepal concave, erect, the laterals more or less falcate or decurved, adnate to the foot of the column, forming a mentum. Petals subequal to the lateral sepals. Lip entire, somewhat concave at the base, spreading, articulated to the foot of the column. Column arcuate, auriculate near the apex, or broadly winged throughout its

length; base produced into a short foot. Anther terminal, operculate, incumbent, 1-celled; pollinia 4, waxy.

A few American terrestrial orchids of remarkably uniform vegetative and floral structure. It seems evident that relatively trivial differences in size, color, length of the raceme, and geographic locality have been considered as adequate for the segregation of most of the so-called species. Only two entities showing any consistent structural differences are known to occur in Panama, where they seem to be confined to the Chiriquí highlands. The sterile plants greatly resemble those of *Calanthe mexicana*.

a. Lip lanceolate, lateral margins minutely ciliate..... 1. G. CILIILABIA
aa. Lip broadly ovate, lateral margins not ciliate..... 2. G. LILIACEA

1. GOVENIA CILIILABIA Ames & Schweinf. in Sched. Orch. 10:80. 1930.

Erect terrestrial herbs 30–36 cm. tall. Leaves 2, broadly plicate, elliptic, shortly acuminate, 30–36 cm. long and 5.5–9 cm. broad, contracted at the base into an elongate sheathing petiole enclosed by 2–3 obtuse or very shortly acute, tubular, imbricating bracts. Inflorescence erect, the sheathing petiole enclosing a slender raceme scarcely equaling the leaves. Flowers small for the genus, membranaceous. Dorsal sepal elliptic-oblong, acute, concave, 10–13 mm. long and 4.2–5 mm. broad, the lateral sepals obliquely elliptic-lanceolate, acute, 9.5–10.5 mm. long and 3.5–3.8 mm. wide. Petals oblique, subfalcate, acute, 10–11 mm. long and 5–5.2 mm. wide. Lip entire, oblong-lanceolate, with minutely ciliate margins; base articulated to the foot of the column. Column arcuate, fleshy, broadly winged, dilated above, 6–7 mm. long, produced at the base into a foot.

Costa Rica and Panama.

CHIRIQUÍ: vic. Casita Alta, Volcán de Chiriquí, 1500–2000 m., *Woodson, Allen & Seibert 947*.

The flowers of the single specimen bear the description: "yellow, purple striped; lip violet rose, with a white tip."

2. GOVENIA LILIACEA Lindl. in Bot. Reg. 21: *t. 1795*. 1836; 24: *t. 13*. 1838.

Govenia utriculata (Sw.) Lindl. in Bot. Reg. 25: Misc. 47. 1839.
Limodorum utriculatum Sw. Prodr. 119. 1788.
Cymbidium utriculatum Sw. in Nova Acta Soc. Sci. Upsal. 6:75. 1799.
Govenia Powellii Schltr. in Fedde Rep. Sp. Nov. 17:51. 1922.

Erect terrestrial herbs 45–65 cm. tall. Leaves 2, plicate, elliptic, shortly acute or lanceolate-acuminate, contracted at the base into a sheathing petiole, the bases enclosing a short, stout, fleshy, cylindric, tapering pseudobulb. Inflorescences erect, leafless scapes, racemose or subcapitate, less than, equal to, or exceeding the leaves, the bases enveloped by the tubular imbricating petiolar bracts. Flowers few to many. Dorsal sepal lanceolate, shortly acuminate, 10–16 mm. long and 4–5 mm. broad, lateral sepals oblique, lanceolate, subfalcate, acute, 8–11 mm. long and 4–5 mm. wide. Petals oblanceolate, acute, 10–11 mm. long and 5–6 mm. wide. Lip entire, broadly ovate, acute, 6–9 mm. long and 4.5–7.5 mm. broad, strongly

nerved, the nerves often branching; base articulated to the column foot. Column short, arcuate, 7–8 mm. long, broadly winged and often subauriculate at the apex, produced at the base into a foot.

Mexico, Guatemala, Salvador, Honduras, Costa Rica, Panama, the West Indies, Venezuela, Brazil, Argentina, and Bolivia.

CHIRIQUÍ: in damp, shady places, 4000 ft., *Powell 205;* valley of the upper Río Gariché, 1050–1100 m., *Seibert 329;* Jaramillo, Boquete, 5000 ft., *Davidson 798;* Casita Alta to Cerro Copete, 2300–3000 m., *Woodson & Schery 345;* Volcán de Chiriquí, 8000 ft., *Davidson 934, 946.*

The last three specimens cited seem to show consistent differences from the rest in the longer racemes, the abundant linear bracts, and in the somewhat smaller flowers. In spite of this, however, no significant structural differences could be detected in the flowers. Under the circumstances it is considered best to include them here, at least until the genus as a whole is critically studied.

46. MORMODES Lindl.

MORMODES Lindl. Introd. Nat. Syst. Bot. ed. 2, 446. 1836; Benth. & Hook. Gen. Pl. 3:552. 1883.

Cyclosia Kl. in Allgem. Gartenzeit. 6:305. 1838.

Epiphytic herbs, with cylindric or fusiform pseudobulbs usually tapering uniformly upward. Leaves plicate, strongly veined, distichous, the unarmed imbricating bases enclosing the pseudobulbs; leaf blades deciduous. Inflorescences arching racemes produced from the base or lower sides of the pseudobulbs. Flowers few or many, often richly colored. Sepals free, subequal, spreading or strongly reflexed. Petals subequal to the sepals or sometimes broader. Lip entire or 3-lobed, often fleshy, the lateral lobes or margins usually strongly reflexed, base often with a claw which is adnate to the base of the column. Column usually curved and twisted to one side so that the dorsal surface of the apex rests against the lip, the anther and stigmatic surface being thus exposed; rostellum without antennae, base of the column without a foot. Anther terminal, operculate, incumbent, 1- or imperfectly 2-celled, extremely sensitive; pollinia 2 or 4, waxy, often ejected during the process of pressing the flowers and found adhering to the lip, or to one of the other floral parts.

An interesting genus of American epiphytic orchids, ranging from Mexico to Peru and Brazil, vegetatively reminiscent of *Catasetum*, but readily distinguishable even when not in flower by the absence of spines on the upper margins of the imbricating leaf bases enveloping the old pseudobulbs. Many species have been described, often founded on single specimens flowering in European greenhouses. Although many entities enter into the present confused picture, it seems probable that most represent color forms of either *Mormodes igneum* or *M. atropurpureum*. In spite of this abundance of named color forms, valid diagnostic characters seem to exist, based mostly on the lobes in the lip, whether present or absent, and their

relative size, shape or indument. Although even these characters are subject to a certain amount of individual interpretation, four fairly well-marked entities can be separated in Panama. Due to the extreme tortion of all of the floral parts, it is generally necessary to spread the lip out fully to obtain any adequate idea of its shape.

a. Lip distinctly 3-lobed, about as long as broad; mid-lobe projecting conspicuously beyond the laterals, the apex sometimes recurved..... 1. M. ATROPURPUREUM
aa. Lip entire, or of two lateral lobules with a shortly apiculate apex.
  b. Blade of lip elliptic-ovate to rhombic-ovate, acute or acuminate, not abruptly apiculate, about twice as long as broad..... 2. M. COLOSSUS
  bb. Blade of lip obovate, oval or suborbicular, obtuse, or truncate, abruptly apiculate, about as long as broad.
    c. Lip glabrous..... 4. M. IGNEUM
    cc. Lip pubescent..... 3. M. HOOKERI

1. MORMODES ATROPURPUREUM Lindl. Introd. Nat. Syst. Bot., ed. 2, 446. 1836, non Hook.

Epiphytic herbs with very stout pseudobulbs. Inflorescences erect racemes, produced from near the base of the pseudobulbs. Sepals subequal, free, spreading, lanceolate, acute or acuminate, the dorsal sepal 2.4–2.6 cm. long and .6–.7 cm. wide, laterals lanceolate, acute or acuminate, 2.6–2.8 cm. long and .7–.8 cm. wide. Petals elliptic-lanceolate, acute, 2.5 cm. long and .9–1.1 cm. wide. Lip distinctly 3-lobed, 1.8–2 cm. long and 1.8–2 cm. wide when spread out, the lateral lobes rounded and strongly reflexed, the entire mid-lobe projecting beyond the laterals, subcuneate, abruptly apiculate. Column twisted to one side. Flowers described as "red-brown, with small spots. Lip rose, spotted with red-brown."

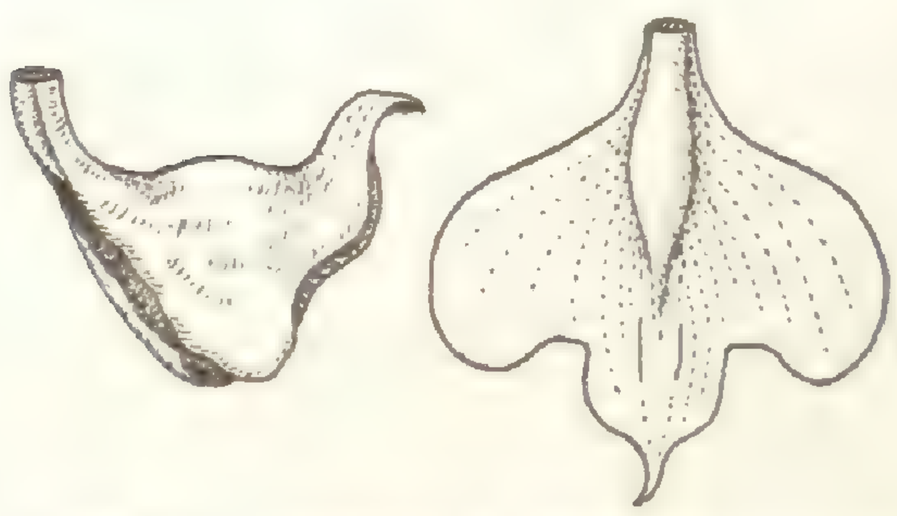


Fig. 155. *Mormodes atropurpureum*—lip

Costa Rica and Panama.

CHIRIQUÍ: Caldera River, 3500 ft., *Powell s. n.*; Concepción, 800 ft., *Powell s. n.*; vic. Progreso, 1000 ft., *Dunn s. n.*

Seemingly rare. Most of the specimens previously determined as *Mormodes atropurpureum* Lindl. are dark red color forms of *M. igneum*.

2. MORMODES COLOSSUS Rchb. f. in Bot. Zeit. 10:636. 1852.

Mormodes macranthum Lindl. & Paxt. in Paxton's Flow. Gard. 3:98. 1852–53.
Mormodes Wendlandii Rchb. f. in Walp. Ann. 6:581. 1861.
Mormodes Powellii Schltr. in Fedde Rep. Sp. Nov. 17:55. 1922.

Epiphytic herbs. Pseudobulbs often long, cylindric, tapering. Leaves plicate, deciduous, the persistent imbricating bases unarmed. Inflorescences long arching racemes produced from near the base of the pseudobulbs. Sepals subequal, spreading, linear-lanceolate, acuminate, 3.5–5 cm. long and .6–.8 cm. wide. Petals subequal to

Fig. 156. *Mormodes colossus*—lip

the sepals, lanceolate, acuminate, 3.2–4.5 cm. long and .7–1.0 cm. wide. Lip elliptic-ovate to rhombic-ovate, acute or acuminate, 3.2–5 cm. long and 1.6–2.5 cm. wide when spread out, the lateral margins often strongly recurved, dried specimens frequently giving the impression of being linear-lanceolate; base shortly clawed. Column 1.5–1.7 cm. long, twisted to one side, typical of the genus.

Costa Rica and Panama.

CANAL ZONE: Gatún Lake and Río Chagres, sea level, *Powell s. n.;* Ana Lago, sea level, *Powell s. n.;* Gatún Lake, *Powell s. n.;* upper Chagres region, *Powell s. n.* COCLÉ: vic. El Valle de Antón, 800–1000 m., *Allen 76;* El Valle, *Cope s. n., Fairchild s. n.*

There seem to be no consistent structural differences upon which to separate *M. macranthum*, *M. Wendlandii* or *M. Powellii* from *M. colossus*. The species is somewhat variable, particularly in the size and coloration of the flowers. They are variously described in Panama as with "Sepals and petals olive green, yellowish brown or cream. Lip brown, tan or yellow. Fragrant." The specimens from El Valle de Antón are smaller than typical *M. colossus*, and the lip rather broader near the base when spread out, but both these differences represent deviations in degree rather than in the presence or absence of any essential character.

3. MORMODES HOOKERI Lem. Jard. Fleur. 1: Misc. 116. 1851–54.

Mormodes atro-purpurea Hook. in Bot. Mag. *t. 4577.* 1851, non Lindl.
Mormodes barbatum Lindl. & Paxt. in Paxton's Flow. Gard. 2:57. 1851–53.

Epiphytic herbs; pseudobulbs dwarf, in specimens seen about 8–10 cm. tall, otherwise typical of the genus. Leaves plicate, deciduous. Inflorescences short erect racemes from the base of the pseudobulbs. Flowers few to many, dark reddish brown or red; if many, set closely together in a dense raceme. Sepals subequal, lanceolate, acuminate, strongly reflexed, dorsal sepal 1.8–2 cm. long and .45–.5 cm. wide, laterals 1.7–1.8 cm. long and .55–.65 cm. wide. Petals subequal to the sepals, lanceolate, acuminate, strongly reflexed, 1.6–1.8 cm. long and .55–.65 cm. wide. Lip obovate, truncate, abruptly and minutely apiculate, about as long as broad when spread out, 1.4–1.6 cm. long and 1.4–1.6 cm. wide, lateral lobes very strongly reflexed, pubescent. Column twisted to one side, typical of the genus.

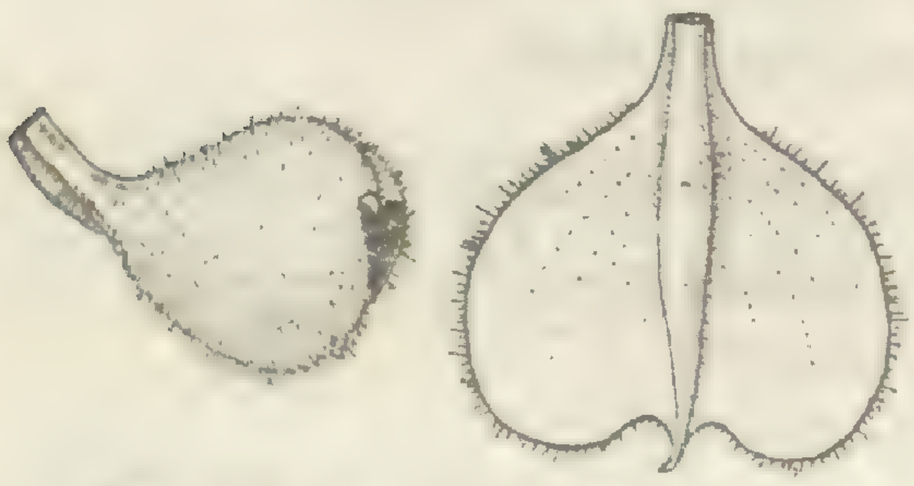


Fig. 157. *Mormodes Hookeri*—lip

Panama and Costa Rica.

Although no herbarium material of this species is at present available from Panama, it appears in the 'Botanical Magazine' (*t. 4577*) under the erroneous name of *Mormodes atro-purpurea* Hook., with the notation that it had been obtained from one of the sales of Warscewicz's Panama plants. Also, a plant was flowered in the Missouri Botanical Garden collection in Balboa, C. Z. in 1940, having been collected in the vicinity of El Valle de Antón, in Coclé Province. Unfortunately these flowers were not preserved. The species is therefore listed without hesitation for our area, in spite of the lack of actual specimens. Schlechter's citation of *M. Hookeri* in Panama may probably be based on specimens in some European herbarium, but actually all specimens seen by the writer which had been determined by Schlechter as such are dark red color forms of *M. igneum*. Except for the pubescent lip and the dwarf habit, the species is not remarkably distinct from *M. buccinator*, and may, in fact, prove to be only a very distinct variety or geographical race.

4. MORMODES IGNEUM Lindl. & Paxt. in Paxton's Flow. Gard. 3:97, *t. 93*. 1852–53.

Epiphytic herbs. Pseudobulbs stout, cylindric, tapering uniformly from the base upward, 10–35 cm. tall and 1–5 cm. wide. Leaves 5–15, plicate, distichous, strongly veined, the persistent, closely imbricating, unarmed bases closely enveloping the pseudobulbs, the lanceolate, acuminate blades deciduous at the end of the growing season. Inflorescences 1 to several, erect, arching racemes produced in succession from near the base of the pseudobulbs. Flowers few to many, variable in color, size, and texture. Sepals subequal, membranaceous, yellow, olive-green, tan-brown or red, often with minute spots, the dorsal sepal erect, lanceolate, acuminate or apiculate, 1.8–2.8 cm. long and .5–.7 cm. wide, the laterals lanceolate, acuminate, strongly reflexed, 1.5–2.7 cm. long and .4–.7 cm. wide. Petals subequal to the sepals, similarly colored, elliptic-lanceolate, acute, usually strongly reflexed, 2–2.5 cm. long and .6–.8 cm. wide. Lip suborbicular when spread out, shortly apiculate, glabrous, usually fleshy to very fleshy, white, yellow, olive-green, tan, brown, or dark reddish brown, often with minute brown or reddish brown spots, the lateral margins strongly reflexed, the base conspicuously clawed. Column twisted to one side, typical of the genus.

Costa Rica, Panama, and Colombia.

CANAL ZONE: Gatún Lake, *Powell s. n.*; Frijoles, *Powell s. n.*; Las Cascadas, *Powell s. n.* PANAMÁ: San Juan, *Powell s. n.*; upper Chagres, *Powell s. n.*; foothills east of city, *Powell s. n.*; Río La Maestra, 0–25 m., *Allen 64;* Cerro Campana, 1000 ft., *Fairchild s. n.* COCLÉ: lower valley and marshes along the Río Antón, El Valle de Antón, 500 m., *Hunter & Allen 388;* hills south of El Valle de Antón, 700 m., *Fairchild s. n.*; floor of El Valle de Antón, 600 m., *Allen 3985, 5182.* VERAGUAS: vic. Santa Fé, 1000 ft., *Allen 4419.* CHIRIQUÍ: 800 ft., *Powell s. n.*; Caldera River, 3500–4000 ft., *Powell s. n.*

Fig. 158. *Mormodes igneum*

This is by far the most frequent species of *Mormodes* found in Panama, distributed throughout the lowlands of both coasts and ascending to about 4000 feet on the Pacific slope. The plants are frequently found growing in the tops of dead trees or on projecting dead branches, displaying a marked preference for decaying wood and exposure to full sun. The flowers are extremely variable in color and to a lesser degree in size and texture, scarcely any two being exactly alike.

47. CATASETUM L. C. Rich.

Catasetum L. C. Rich. ex Kunth, Syn. Pl. Aequin. 1:330. 1822; Benth. & Hook. Gen. Pl. 3:551. 1883; Mansfeld, in Fedde Rep. Sp. Nov. 30:257–275. 1932; 31:99–125. 1932.

Myanthus Lindl. in Bot. Reg. 18: sub *t. 1538*. 1832.
Monachanthus Lindl. loc. cit. 1832.
Cuculina Raf. Fl. Tellur. 4:49. 1836.

Monacanthus G. Don. in Sweet, Hort. Brit. 3:644. 1839.
Catachaetum Hoffmsgg. Verz. Orchid. 22. 1842.
Clowesia Lindl. in Bot. Reg. 29: Misc. 25, *t. 39*. 1843.
Warczewitzia Skinner in Lindl. & Paxton's Flow. Gard. 1:45. 1850–51.

Epiphytic herbs. Pseudobulbs fleshy, fusiform, or subconic; roots often with many secondary, slender, erect, spinous rootlets which form dense mats about the base of the plants. Leaves plicate, strongly nerved, the blades deciduous; the persistent imbricating bases closely enveloping the pseudobulbs, armed at the apex with short, sharp spines. Inflorescences arching or pendulous racemes from the base of the pseudobulbs. Flowers few or many, often large and showy, unisexual or perfect. Sepals and petals in all forms free, subequal, fleshy or membranaceous, part or all of them spreading or reflexed and connivent at the base. The genus is divided by Mansfeld into two distinct sections. In CLOWESIA: flowers perfect (containing both a functional stigmatic surface and a fertile anther); column without elongate antenna-like processes; lip membranaceous or fleshy. In ORTHOCATASETUM: flowers unisexual, the staminate and pistillate forms strikingly dissimilar and usually produced on separate scapes; staminate flowers (those most frequently seen) usually many, often conspicuously colored, on an arching or pendent raceme; lip membranaceous, fleshy, spreading, concave or galeate, the margins entire, lobulate, emarginate, crenate, fimbriate or dentate; column erect, footless, the under-side usually with two elongate antenna-like processes which are extremely sensitive when touched, ejecting the pollinia with considerable force. Anther terminal, operculate, incumbent, convex, 1-celled or imperfectly 2-celled; pollinia 4, waxy, in 2 pairs, or 2-lobed or 2-sulcate. Pistillate flowers less frequently produced, usually few, on short, erect or arching racemes. Lip usually very fleshy and galeate, with or without a thickened margin. Column short and stout, without antennae; functional stigmatic surface present.

A large and remarkable genus of American orchids ranging from Mexico to Peru and Brazil. They are among the most interesting of all known orchids, but segregation of the various entities has been delayed and confused by the dimorphism of the flowers. Many synonymous names have been added to the literature from specimens flowering in European greenhouses, most being color forms of now well-known species. However, much remains to be done, and some instances still exist (in the section ORTHOCATASETUM) where only the staminate, or the pistillate form is known, or at least the forms have not been correlated with each other. Both sections of the genus are represented in Panama, each with three species.

a. Flowers perfect. Column without elongate antennae. (Section CLOWESIA.)
  b. Lip 3-lobed, membranaceous, apical lobe fimbriate..... 6. C. WARCZEWITZII
  bb. Lip entire, very fleshy, apex obtuse or acute.
    c. Sepals and petals very strongly reflexed. Apex of the lip acute.... 4. C. SUAVE
    cc. Sepals and petals spreading. Apex of the lip obtuse..... 2. C. EBURNEUM
aa. Flowers dimorphic. Column of the staminate flowers (in the Panama species) with 2 elongate antennae. (Section ORTHOCATASETUM.*)

*The key in this section is based on staminate flowers. It is usually difficult or impossible to identify the pistillate flowers, particularly from dried material.

b. Lip of the staminate flowers with 5 elongate, marginal processes. Total length of the lip 1 cm. or less..... 1. C. BICOLOR

bb. Lip of the staminate flowers without elongate marginal processes. Total length 2 cm. or more.

c. Lip globose above, with an abrupt, conical, basal constriction, lateral margins minutely ciliate; inner lip strongly rugose-striate.... 5. C. VIRIDIFLAVUM

cc. Lip obconic, uniformly tapering, the base not abruptly constricted, lateral margins fimbriate; inner lip glabrous..... 3. C. OERSTEDII

1. CATASETUM BICOLOR Klotzsch, in Allgem. Gartenzeit. 22:337. 1854.

Catasetum gongoroides Kränzl. in Fedde Rep. Sp. Nov. 23:254. 1930.

Epiphytic herbs. Pseudobulbs dwarf, subconic or cylindric, tapering, 4–9.5 cm. long and 2.5–4 cm. wide. Leaves plicate, distichous, elliptic-lanceolate, acute or acuminate, the imbricating persistent bases enveloping the pseudobulbs, the old growth armed at the apex with sharp spines, the leaf blades deciduous at the end of the growing season. Flowers unisexual, dimorphic, produced on separate scapes. Staminate inflorescences arching or pendent racemes 8–15 cm. long, from the base of the pseudobulbs. Sepals subequal, free, lanceolate, acuminate, brownish green, purplish, flesh-pink or dark reddish brown, 2.5–4 cm. long and 2.8–3.2 mm. wide, dorsal sepal erect, laterals strongly reflexed or spreading, often more or less parallel with the elongate peduncle. Petals subequal to the sepals, elliptic-lanceolate, acute, pale green, purplish green, or flesh-pink, spotted red-brown, 2.5–3 cm. long and 4–5 mm. wide, erect and closely approximating the dorsal sepal, the three segments closely arching over the column. Lip short, the base saccate, the apex complexly 3-lobed; lateral lobes erect, 2 on each side, about equaling the saccate base in length, the upper pair linguiform, obtuse, the lower pair linear-lanceolate, acuminate; mid-lobe triangular, spreading, the entire lip including lobes 5–10 mm. long, white or pale yellow, the margins of the central lobe red-brown, the lateral lobes and inner surface of the saccate base also irregularly blotched red-brown. Column slender, erect, conspicuously rostrate at the apex, winged, 12–15 mm. long and about 4 mm. broad, under-surface with 2 elongate antennae, the points of which extend to the inner base of the saccate lip. Pistillate flowers relatively rare, produced on few-flowered, erect racemes 8–10 cm. tall, from the base of the pseudobulbs. Sepals free, subequal, spreading or reflexed, coriaceous, elliptic-lanceolate, acute, pale green, 2 cm. long and 4–6 mm. wide. Petals subequal to the sepals, spreading, coriaceous, elliptic-lanceolate, with oblique acute tips, green, minutely spotted red-brown, 2–2.3 cm. long and .6–.7 cm. wide. Lip fleshy, calceiform, yellowish green, 18–20 mm. long and 15 mm. wide, with an acute, thickened, broadly triangular apex. Column short, stout, broadly triangular in cross-section, 8 mm. long and 7 mm. wide, with a narrow, lunate functional stigmatic surface.

Panama and possibly Colombia.

Fig. 159. *Catasetum bicolor*

CANAL ZONE: Limon Island, vic. Nuevo Limon, Gatún Lake, 80 ft., *Cope & Babbitt s. n.*; Barro Colorado Island, *Zetek s. n.*; without definite locality, *Barrett s. n.* COLÓN: Cerro Santa Rita, 1200 ft., *Allen & Fairchild 5181.* CHIRIQUÍ: Chiriquí Volcano, 3000–3500 ft., *Powell 168.*

Frequent plants of the upper slopes of the wet forested mountains of Colón Province, where they are usually found growing on old logs and stumps, showing a decided preference for dead and decaying wood. Also recorded from the slopes of Chiriquí Volcano, but not seen there in recent years. The plants when not in flower are almost identical in vegetative appearance with those of *Catasetum Warczewitzii.*

2. CATASETUM EBURNEUM Rolfe, in Kew Bull. 86. 1906.[1]

Epiphytic herbs. Pseudobulbs cylindric, tapering, 5–8 cm. tall and 2–2.5 cm. wide. Leaves plicate, with 3 prominent veins, lanceolate, acuminate, 15–30 cm. long and 2–3.5 cm. wide; the persistent imbricating bases enveloping the old pseudobulbs, armed at the apex with sharp spines; the leaf blades ultimately deciduous. Inflorescence an arching raceme from the base of the pseudobulb, 18–30 cm. long. Flowers perfect, waxy white, the lip shaded and spotted yellow, fragrant. Sepals fleshy, subequal, free, spreading, or somewhat reflexed, oblong, obtuse, 1.7–2 cm. long and .8–1 cm. wide. Petals fleshy, spreading, ovate-elliptic, acute, 1.3–2 cm. long and 1–1.2 cm. wide. Lip entire, very fleshy, saccate, adnate to the base of the column, broadly ovate, obtuse; inner lip with two lateral erect ridges on either side of the basal concavity, terminating toward the apex in a low, emarginate, fleshy crest. Column very short, stout, terete, 8 mm. long and 8 mm. broad, without antennae. Anther with obtuse lateral lobules, the apex sagittate.

Panama and Colombia.

PANAMÁ: Cerro Campana, on low trees along margins of grassland, 2500 ft., *Allen 4559.*

A seemingly rare species, thus far known only from a few plants collected on the upper slopes of Cerro Campana where they were found on low trees on the margins of the extensive grasslands. Vegetatively they are reminiscent of immature plants of *C. viridiflavum,* but lack the erect, spinous, matted, secondary rootlets so characteristic of that species.

---

[1] *Catasetum eburneum* is considered by Mansfield to be referable to the earlier *dilectum* Rchb. f. (Beih. Orch. Central-Amer. 73. 1866). However, careful comparison of our material with the Reichenbach description and drawing of the type in the Ames herbarium has disclosed wide discrepancies in nearly every essential structural detail. The description of *eburneum* by Rolfe, on the other hand, agrees with our specimens in almost every respect except that our flowers are somewhat smaller. Since our plant flowered in cultivation under somewhat abnormal conditions, some difference in size would be expected.

Fig. 160. *Catasetum eburneum*

3. CATASETUM OERSTEDII Rchb. f. in Bonplandia 3:218. 1855.

Catasetum rostratum Klinge, in Acta Hort. Petropol. 17:134, *t. 2.* 1898.
Catasetum Brenesii Schltr. Beitr. Orchk. Zentralam. 2:136, 225. 1923.

Stout epiphytic herbs with fusiform pseudobulbs 8–30 cm. tall and 3.5–5 cm. wide; roots with many slender, erect, spinous secondary rootlets, forming a dense mat about the base of the plants. Leaves 5–12, plicate, strongly nerved, elliptic-

lanceolate, acute or acuminate, 15–60 cm. long and 3–12 cm. wide, the blades deciduous at the end of the growing season, the persistent imbricating bases enveloping the old pseudobulbs, armed at the apex with sharp spines. Inflorescences arching racemes 12–50 cm. long, produced from the base of the pseudobulbs. Flowers relatively large and conspicuous, unisexual, dimorphic, the staminate and pistillate forms produced on separate scapes. Staminate flowers those most frequently seen, few to many on an arching raceme. Sepals membranaceous, free, green, greenish brown or marked with purple or red-brown, the dorsal sepal concave, oblanceolate, curving over the column, acuminate, 3.5–4 cm. long and 1.2–1.4 cm. wide, the laterals spreading, more or less oblique, lanceolate, acuminate, 4–4.5 cm. long and 1.5–1.7 cm. wide when spread out, the margins often involute. Petals membranaceous, green or marked with purple or red-brown, elliptic-oblanceolate, obliquely acuminate, 3.5–4 cm. long and 1.8–2 cm. wide, the inner margins somewhat overlapping below the dorsal sepal, forming with it a concave trough under the column. Lip very firm and fleshy, obconic, uniformly tapering, 2.5–3.5 cm. long and 2–2.2 cm. wide, green, marked or spotted purple, red-brown, or yellow, glabrous on the outer surface and within except for a fleshy lunate callus just below the apical margin, lateral margins fimbriate, the apex emarginate or rarely entire. Column rostrate, arcuate, broadly winged, 3 cm. long and 1–1.2 cm. wide, the under-surface with 2 slender elongate antennae, one unciform, closely approximating the base of the column, the other slightly undulate, the tip extending nearly to the innermost base of the lip. Pistillate flowers relatively infrequent, fleshy, green on outer surfaces, yellow within, usually 2–3 on erect racemes, very similar to those of *C. viridiflavum*, but with the lip somewhat shorter, broader, and rounder.

Nicaragua (*fide* Mansfeld), Costa Rica, Panama, and possibly Colombia.

VERAGUAS: vic. Soná, 200 m., *Allen 2664;* vic. San Felix, 100 m., *Allen 3658.* CHIRIQUÍ: near Dolega, 1000 ft., *Powell 351;* vic. Remedios, 100 ft., *Allen 4505, 4506, Allen & Fairchild 3512;* vic. Progreso, 500 ft., *Dunn s. n.;* vic. Concepción, 1000 ft., *Allen 5165.* BOCAS DEL TORO: Chiriquí Lagoon, Bastimentos, *von Wedel 2906;* Water Valley, *von Wedel 638, 863, 1375, 1435;* Western River, *von Wedel 2780;* Little Bocas, *von Wedel 2544;* Isla Colón, Macaw Hills, *von Wedel 523, 555;* Careening Cay, *von Wedel 568.*

A robust, very frequent species of the lowlands of Bocas del Toro, Chiriquí, and Veraguas provinces. It seems to be entirely confined, so far as known, to the western portion of the Republic, being replaced in the vicinity of the Canal by *C. viridiflavum.* The staminate flowers are extremely variable in color, and to a lesser degree in size.

It seems possible that this species may be that collected in 1801 by Humboldt and Bonpland near Cartagena, Colombia, and described by Kunth (Syn. Pl. Aequin. 1:331. 1822) as *Catasetum maculatum.* However, since the description does not agree with the plate in Humboldt, Bonpland and Kunth's 'Nova Genera et Species Plantarum', and since the type apparently no longer exists, it seems best to follow Mansfeld and adopt *C. Oerstedii* as the next available, well authenticated name.

4. CATASETUM SUAVE Ames & Schweinf. Sched. Orch. 10:81. 1930.

Epiphytic herbs. Pseudobulbs, leaves, and roots superficially identical with those of *Catasetum eburneum*. Inflorescence an arching raceme from the base of the pseudobulb, 20–30 cm. long. Flowers perfect, 8–13, pedicellate, the smallest of the genus in Panama, pure waxy white, inner lip spotted purple, strongly fragrant. Sepals subequal, free, somewhat fleshy, very strongly reflexed; dorsal sepal ligular, rounded or subacute, 1.7–2.3 cm. long and .5–1.0 cm. wide, the laterals similar, 1.8–2.3 cm. long and .4–1.0 cm. wide. Petals somewhat fleshy, very strongly reflexed, elliptic-ovate, acute, often with involute margins, 1.5 cm. long and 1–1.4 cm. wide. Lip entire, the saccate base very fleshy, ovate, acute, with thinner margins and apex, adnate to the base of the column, 1.5–1.6 cm. long and 1–1.2 cm. wide; the basal concavity surrounded by a conspicuous semicircular ridge, with an angulate, submarginate apex. Column very fleshy, 6–8 mm. long and 5–6 mm. wide. Anther with obtuse lateral lobules, the apex apiculate.

Fig. 161. *Catasetum suave*—single flower

Costa Rica and Panama.

VERAGUAS: Cerro Tuté, region west of Santa Fé, 3000 ft., *Allen 4565*.

An apparently rare species in Panama, known from a single specimen collected in the mountains of Veraguas and flowered in Gamboa.

Mansfeld, in his monograph of the genus, considers this species, as well as *C. eburneum*, as being identical with *Catasetum dilectum* Rchb. f. Careful comparison of our specimens with Reichenbach's description and figure has disclosed wide discrepancies in nearly every detail of size and structure. Neither of our Panama species have the flat, apiculate lip, subcapitate inflorescence, or pubescent rachis ascribed by Reichenbach to *Catasetum dilectum*.

5. CATASETUM VIRIDIFLAVUM Hook. in Bot. Mag. *t. 4017*. 1843.

Catasetum serratum Lindl. in Bot. Reg. n. s. 10: post *t. 24*. 1847.

Epiphytic herbs with robust fusiform pseudobulbs 8–25 cm. tall and 2–4.5 cm. wide, identical in vegetative appearance with those of *Catasetum Oerstedii*. Leaves 6–12, plicate, elliptic-lanceolate, acuminate, distichous, 20–45 cm. long and 5–12 cm. wide, the prominent veins persisting as stout spines at the apex of the imbricating bases after the leaf blades have fallen, most noticeable at the apex of the older pseudobulbs where they form a dense spinous cluster. Roots stout, with erect, slender, spinous, secondary rootlets which form a dense mat about the base of the pseudobulbs. Inflorescences erect or arching racemes produced from the base of the pseudobulbs, 25–70 cm. long. Flowers dimorphic, unisexual, the staminate and pistillate forms borne on separate scapes. Staminate flowers: those most frequently seen, 2–12, relatively large and conspicuous. Sepals membranaceous, free, subequal, pale green aging yellow, the dorsal sepal concave, elliptic-lanceolate,

Fig. 162. *Catasetum viridiflavum*

acute, 3.5–5 cm. long and 1.0–2.5 cm. wide, the laterals spreading, oblanceolate, acute, 4.5–5 cm. long and 1.5–3.0 cm. wide. Petals membranaceous, pale green aging yellow, ovate, acute, 3.5–4.5 cm. long and 2–3 cm. wide, the inner margins somewhat overlapping, forming with the dorsal sepal a concave trough under the column. Lip very firm, fleshy, globose, 3–3.5 cm. long and 3–3.5 cm. broad, with an abrupt, conical basal constriction, outer surface glabrous, yellow, the lateral margins minutely ciliate, pale green, aging yellow, apex obscurely emarginate; inner lip orange, strongly rugose-striate, terminating in a spreading fleshy callus just below the apex. Column rostrate, arcuate, broadly winged, 3.5 cm. long and 1.2 cm. broad, the under-surface with 2 elongate antennae, one usually unciform, the tip of the other extending nearly to the inner base of the lip. Anther rostrate; pollinia normal, ejected with considerable force on the slightest disturbance of the anther or antennae. Pistillate flowers relatively infrequent, 2–4 on an erect raceme. Sepals subequal, fleshy, green, spreading or reflexed, the dorsal sepal rectangular, obtuse or broadly acute, 1.5–2 cm. long and 1–1.2 cm. wide, the laterals broadly ligular, obliquely acute, 2–2.5 cm. long and 1.0–1.2 cm. broad. Petals fleshy, green, erect or reflexed, elliptic-lanceolate, acute, 2–2.5 cm. long and 1.2–1.5 cm. broad. Lip fleshy, firm, calceiform, 3–4 cm. long and 2.5–2.7 cm. broad, green on the outer surfaces, aging greenish yellow within, glabrous throughout. Column fleshy, very short, stout, 8–10 mm. long and 8–10 mm. broad, roughly triangular in cross-section, green or greenish yellow. Stigma normal.

Panama.

CANAL ZONE: Barro Colorado Island, Gatún Lake, *Woodworth s. n.*; vic. Nuevo Limón, *Babbitt s. n.*; Barro Colorado Island, *Kennoyer 252, 253;* Frijoles, *Powell 3556;* among floating islands, north arm of Gigante Bay, *Dodge 3482;* vic. Gamboa, 100 ft., *Allen 5149.* PANAMÁ: vic. Arenoso, lower Río Trinidad, 26–50 m., *Seibert 597;* Bella Vista, sea level, *Killip 12040;* drowned forest near Vigía and San Juan, Río Pequení, 66 m., *Dodge, Steyermark & Allen 16591;* hills northeast of La Joya, 50–300 m., *Dodge et al. 16904;* Pacora, 50 m., *Allen 4502, 4524, Fairchild s. n.;* San José Island, Perlas Archipelago, *Johnston 333.* COCLÉ: hills south of El Valle de Antón, 2000 ft., *Fairchild s. n.*

A very frequent species, apparently confined to the lowlands in the eastern half of the Republic.

6. CATASETUM WARCZEWITZII Lindl. & Paxt. in Paxton's Flow. Gard. 1:45, *fig. 29.* 1850–51.

Catasetum scurra Rchb. f. in Gard. Chron. 1003. 1872.

Dwarf epiphytic herbs, with clustered, stout, ovate, acute pseudobulbs 3–9 cm. tall and 2–4 cm. wide, often becoming conspicuously ridged and wrinkled with age, nearly identical in appearance with those of *Catasetum bicolor.* Leaves 4–6, elliptic-lanceolate, plicate, ultimately deciduous, 12–40 cm. long and 2.5–8 cm. wide, the broad imbricating bases enveloping the pseudobulbs, persistent for a year or more after the blades have fallen, drying grayish white, the strong midribs projecting beyond the old suture line as sharp spines, clustered at the apex of the

old pseudobulbs. Inflorescences laxly pendent, unbranched racemes from the base of the pseudobulbs. Flowers perfect, 5–8, relatively large and conspicuous. Sepals membranaceous, white or greenish white, striped pale green, dorsal sepal concave, erect, ovate, obtuse, 10–12 mm. long and 8–10 mm. broad, laterals spreading, adnate at the base, obliquely ovate, obtuse, 15–18 mm. long and 10–14 mm. wide. Petals membranaceous, subequal to the sepals, white or greenish white, striped pale green, spreading, concave, ovate, obtuse, 10–12 mm. long and 10–12 mm. wide. Lip 3-lobed, white or greenish white, striped pale green, the base saccate and somewhat fleshy, hinged to the base of the column, the lateral lobes erect, the anterior margins spreading, fimbriate, mid-lobe reflexed, the apex strongly fimbriate. Column short, the under-surface without antennae, inflated at the apex, 6–7 mm. long.

Costa Rica, Panama, Colombia, and Venezuela.

CANAL ZONE: Gatún Lake, sea level, *Powell 60;* Frijoles, sea level, *Powell 3477.* PANAMÁ: Río La Maestra, 0–25 m., *Allen 57;* drowned forest below the Río Indio Hydrographic station, 70 m., *Steyermark 17379;* without definite locality, *Pring s. n.* COCLÉ: El Valle de Antón, 600 m., *Allen 3916;* El Valle, 1800 ft., *Fairchild s. n.*

A frequent species found in the lowlands of both coasts, and at least on the Pacific slope up to about 3000 ft. elevation.

48. CYCNOCHES Lindl.

CYCNOCHES Lindl. Gen. & Spec. Orch. Pl. 154. 1832; Benth. & Hook. Gen. Pl. 3:552. 1883; Schltr. in Orchis 10:47–61. 1916.

Epiphytic herbs with short or elongate, often slightly undulate pseudobulbs of uniform thickness, tapering at the apex. Leaves few to many, distichous, lanceolate, acuminate, plicate, the blades deciduous, the unarmed, imbricating, persistent, grayish white papery bases tightly enveloping the stems. Inflorescences arching or pendent, unbranched racemes, produced in succession from the upper leaf axils while the plants are still in leaf, or from near the apex of the upper imbricating leaf bases after the blades have fallen. The species of the genus fall into two well marked subgeneric sections. In EUCYCNOCHES, which contains the generic type: both staminate and pistillate flowers large and conspicuous, usually produced on separate scapes, although mixed inflorescences containing both forms may rarely be seen. Sepals and petals in both sexes similar, fleshy or membranaceous, erect or reflexed, the lip in both fleshy, without marginal teeth. Structural differences in this section almost entirely confined to the column, that of the staminate flowers very slender, terete, elongate, and arcuate, bearing the anther at the apex, without a functional stigma or ovary; the pistillate column short, stout, fleshy, more or less winged, particularly at the apex, without an anther, but with a normal stigma and ovary. In HETERANTHAE: staminate and pistillate flowers strikingly dissimilar in size, color and structure, usually produced on separate scapes although mixed inflorescences are rarely seen. Pistillate flowers relatively large and fleshy,

similar in structure to those of the subgenus EUCYCNOCHES, usually produced on short, arching, few-flowered racemes. Staminate flowers small, on elongate, often dense, pendent racemes. Sepals and petals membranaceous, spreading or reflexed, often undulate, the lip reduced to a small ligular, triangular or rounded, usually concave disk, margined by long or short-pointed, forked, rounded or clavate teeth. Column slender, terete, arcuate. In both subgeneric sections the anther of the staminate form is terminal, operculate, incumbent, 1-celled or imperfectly 2-celled; pollinia 2, waxy.

An extremely interesting but poorly understood genus of American epiphytic orchids ranging from Mexico to Peru and Brazil. Schlechter's revision, published in 1916, lists sixteen species, to which some nine or ten have been added to date. Present evidence would indicate that of this considerable total about ten actually represent fairly consistent and valid entities, six of which are known to occur in Panama.

a. Both staminate and pistillate flowers large, nearly identical except for the column. Lip of both sexes very fleshy, with a membranaceous margin or apex, that of the staminate flowers without marginal teeth (Subgenus EUCYCNOCHES).
  b. Lip sessile or nearly sessile, broadly elliptic-lanceolate, acute, convex, nearly twice as long as broad, with a narrow, ovate, obtuse depression below the projecting triangular, basal callus..... 2. C. CHLOROCHILON
  bb. Lip truly clawed at the base, strongly ventricose.
    c. Basal claw of the lip elongate; basal callus broadly obtuse at the apex, not projecting, the surrounding blotched area not depressed.. 6. C. VENTRICOSUM
    cc. Basal claw of the lip short; basal callus triangular, acute, projecting, the surrounding area with a broadly lunate depression..... 5. C. TONDUZII
aa. Staminate and pistillate flowers strikingly dissimilar; pistillate flowers fleshy, relatively large, the lip nearly flat or slightly convex; staminate flowers small, membranaceous, in short or elongate, pendent racemes. Lip truly clawed at the base, the mid-portion concave, with marginal teeth (Subgenus HETERANTHAE).
  b. Staminate flowers relatively large. Sepals and petals spreading or only the apices recurved. Lip 2–2.5 cm. long, ovate, the basal concavity elliptic, broadly lanceolate. Marginal teeth slender, elongate, usually forked at the apex..... 1. C. AUREUM
  bb. Staminate flowers relatively small. Sepals and petals usually strongly recurved and often undulate or revolute. Lip about 1–1.5 cm. long, the basal concavity ovate to orbicular, terminating in a slender lanceolate or ligular apex. Marginal teeth usually rounded or clavate, sometimes forked at the apex.
    c. Marginal teeth very short, rounded or subclavate, inconspicuous in dried specimens..... 3. C. DIANAE
    cc. Marginal teeth elongate, truncate, clavate, or rarely forked at the apex, very conspicuous in dried specimens..... 4. C. EGERTONIANUM

1. CYCNOCHES AUREUM Lindl. & Paxt. in Paxton's Flow. Gard. 3:6, *t.* 75. 1852–53.

Erect epiphytic herbs with stout or slender, cylindric pseudobulbs of uniform thickness, tapering at the apex, 15–30 cm. tall and 2–6 cm. wide; larger, very robust plants infrequently found growing on decaying wood and differing very considerably in superficial appearance from the more familiar slender type. Leaves

6–10, lanceolate, acuminate, plicate, ultimately deciduous, the unarmed, persistent, grayish white, papery, sheathing bases tightly enveloping the stems. Inflorescences produced from the upper half of the pseudobulb, usually either all staminate or all pistillate flowers, although mixed scapes are infrequently seen. Staminate flowers those most frequently produced: relatively large, 6–8 cm. in diameter when spread out, usually borne on long pendulous racemes. Sepals subequal, membranaceous, spreading, only the apices reflexed, pale yellowish green, sometimes veined darker green or nearly white, with minute rose-red spots, dorsal sepal erect, oblanceolate, acute, 3.5–4 cm. long and 1.0–1.2 cm. wide, laterals spreading, elliptic-lanceolate, acute, 3–3.5 cm. long and 1.5–1.8 cm. broad. Petals spreading, oblanceolate, acute, somewhat oblique, colored like the sepals, 3.5–3.8 cm. long and 1.4–1.6 cm. broad. Lip membranaceous, ovate or triangular, acute, white, often obscurely striped green, the middle concavity including the apex 2–2.5 cm. long and 1–1.2 cm. wide, the lateral margins with elongate, slender, arcuate teeth, most of which are forked at the apex, the base of the middle concavity with 2 erect fleshy elongate truncate crests. Column slender, arcuate, terete, 3.5 cm. long, dilated at the apex; pollinia 2, waxy. Pistillate flowers: relatively infrequent, usually 2–4 on short arching scapes, or rarely subtended by several to many of the staminate form, fleshy throughout. Sepals free, spreading, subequal, yellowish green, obscurely veined darker green, the dorsal sepal 4.5–5.5 cm. long and 1.8–2.2 cm. wide, the laterals 4.5–5 cm. long and 1.8–2 cm. wide. Petals similar to the sepals but broader, 3.5–4 cm. long and 2.2–2.5 cm. broad. Lip very fleshy, slightly convex, ovate, acute, greenish yellow shading to green at the apex, about 3 cm. long and 2.0–2.2 cm. wide, with a basal brown lunate crest. Flowers aging greenish yellow, with narrow brown margins to all segments. Column very stout, about 15 mm. long and 4 mm. in diameter at the terete base, the truncate apex dilated, very variable in width, with a triangular or auriculate fleshy wing on each side of the stigmatic surface.

Costa Rica and Panama.

COCLÉ: El Valle de Antón, 800 m., *Koerber s. n.*; region north of El Valle de Antôn, 2000 ft., *Allen 5166*; floor of El Valle de Antón, 600 m., *Allen 3628*; El Valle Chiquito, headwaters of the Río Mata Ahogado, 900 m., *Dunn s. n.* (under *Allen 3800*).

2. CYCNOCHES CHLOROCHILON Klotzsch, in Allgem. Gartenzeit. 6:225. 1838.

Cycnoches Warszewiczii Rchb. f. in Bot. Zeit. 10:734. 1852.

Erect epiphytic herbs, with pseudobulbs and leaves typical of the genus. Inflorescences usually of all staminate or all pistillate flowers. Flowers in either case large and fleshy, differing from one another only in the structure of the column; lip sessile or very nearly so. Staminate flowers those most frequently seen: Sepals subequal, free, spreading, yellowish green, the dorsal sepal erect, lanceolate, acute, concave, 9–11 cm. long and 1.6–1.7 cm. wide, laterals spreading, subfalcate, lanceolate, acute, 6.5–7.5 cm. long and 1.4–1.6 cm. wide. Petals spreading, ellip-

Fig. 163. *Cycnoches aureum*

tic-lanceolate, subfalcate, acute, yellowish green, 7–8 cm. long and 2–2.5 cm. wide. Lip fleshy, sessile or very nearly sessile at the base, elliptic-lanceolate, acute, convex toward the middle, not strongly ventricose, 6–6.5 cm. long and 2.5–3.2 cm. wide, white with a dark green, ovate, obtuse depression below the fleshy, triangular, acute, projecting, dark green, basal callus. Column elongate, slender, terete, arcuate, 2.8–3.2 cm. long, dilated at the apex. Anther and pollinia normal. Pistillate flowers less frequently seen: identical with the staminate except for the structure of the column, which is short and stout with two fleshy, auriculate, lateral wings at the apex; stigma normal.

Panama, Colombia, Venezuela, and the Guianas.

PANAMÁ: Río La Maestra, 0–25 m., *Allen 65*. CHIRIQUÍ: Cordillera, *von Warscewicz*.

A South American species, having its northern limit of known distribution in Panama, where it apparently is rare. It is distinguished from the common *Cycnoches Tonduzii* of Chiriquí and Veraguas Provinces by the somewhat larger flowers, the sessile or very nearly sessile, elliptic-lanceolate, convex, not strongly ventricose lip, and the ovate, obtuse depression below the basal callus. Although *Cycnoches chlorochilon* has been collected in Panama only twice, it is to be expected particularly east of the Canal Zone and in Darien Province.

3. CYCNOCHES DIANAE Rchb. f. in Bot. Zeit. 10:636. 1852.

Cycnoches Powellii Schltr. in Fedde Rep. Sp. Nov. Beih. 17:58. 1922.

Erect epiphytic herbs with slender cylindric pseudobulbs 15–30 cm. tall and 2–3 cm. in thickness. Leaves plicate, deciduous, typical of the genus. Staminate inflorescences those most frequently seen, usually densely flowered, elongate and pendulous: Sepals membranaceous, free, subequal, rosy pink with white shadings, dorsal sepal erect, undulate, the apex recurved, lanceolate, acute, 2.3–2.6 cm. long and .7–.9 cm. wide, laterals often strongly reflexed, the apices recurved, lanceolate, acute, 2–2.2 cm. long and .6–.8 cm. wide. Petals membranaceous, colored similarly to the sepals, spreading, the apical halves very strongly recurved or revolute, elliptic-lanceolate, acute, 2–2.2 cm. long and 0.9–1.1 cm. wide. Lip membranaceous, truly clawed at the base, middle concavity white, orbicular, lateral margins crenate or with very short rounded or subclavate teeth, apex linear-lanceolate, acute, about equaling the middle concavity in length, base of the middle concavity with 2 erect, fleshy, ligular crests. Column very slender, arcuate, dilated at the apex. Anther and pollinia normal. Pistillate flowers relatively large and fleshy, nearly identical with those of *Cycnoches aureum*, produced on short, arching, few-flowered racemes, or rarely subtended by few or many of the smaller staminate form.

Panama, and probably Costa Rica.

CHIRIQUÍ: Caldera River, 4500 ft., *Powell 186*; Chorch Berg, 3000–4000 ft., *Warscewicz s. n.*

This species seemingly is recorded only from the intermediate highlands of Chiriquí Province in Panama, although it is to be expected in adjacent Costa Rica. It differs from the closely related *Cycnoches Egertonianum* in the much shorter marginal teeth on the lip of the male flowers.

4. CYCNOCHES EGERTONIANUM Batem. Orch. Mex. et Guat. *t. 40* (in part). 1837–42.

Cycnoches ventricosum var. *Egertonianum* Hook. in Bot. Mag. *t. 4054*. 1844.
Cycnoches stelliferum Lodd. in Cat. Orch. 25. 1844 (nom. nud.); Lindl in Bot. Reg. n. s. 9: sub *t. 46*, in syn. 1846.
Cycnoches glanduliferum Rich. & Gal. ex Hemsl. in Gard. Chron II, 11:268. 1879.
Cycnoches peruvianum Rolfe, in Lindenia 7:29, *t. 301*. 1891.
Cycnoches Rossianum Rolfe, in Gard. Chron. III, 9:456. 1891.
Cycnoches densiflorum Rolfe, in Kew Bull. 63. 1909.
Cycnoches guttulatum Schltr. in Fedde Rep. Sp. Nov. Beih. 17:56. 1922.
Cycnoches pachydactylon Schltr. loc. cit. 57. 1922.
Cycnoches stenodactylon Schltr. loc. cit. 59. 1922.
Cycnoches Amparoanum Schltr. loc. cit. 19:48. 1923.
Cycnoches pauciflorum Schltr. loc. cit. 137. 1923.

Epiphytic herbs, typical of the genus, nearly identical with *C. aureum* and *C. Dianae*. Flowers dimorphic, unisexual. Staminate flowers those most frequently seen, produced in long, dense, pendent racemes from the upper half of the pseudobulbs: sepals membranaceous, subequal, green suffused purple on the frontal surfaces, or more frequently green or greenish tan spotted with red-brown, maroon or purple, dorsal sepal erect, lanceolate, acute, the apex often recurved, 2.5–3 cm. long and .5–.7 cm. wide, the laterals spreading, elliptic-lanceolate, acute, often with the apical half strongly revolute, 2–2.5 cm. long and .6–1.0 cm. wide. Petals membranaceous, colored similarly to the sepals, spreading, the apical half usually strongly revolute, elliptic-lanceolate, acute, 2–2.5 cm. long and 1–1.2 cm. wide. Lip membranaceous, truly clawed at the base, green tinged purple to pure white, the middle concavity ovate to orbicular, the lateral margins with elongate, rounded, clavate, or rarely forked teeth, equaling or exceeding the middle concavity in length; apical lobe lanceolate, acute or acuminate, the base of the middle concavity with 2 erect, truncate or subclavate, fleshy crests. Column slender, terete, arcuate, 2 cm. long, dilated at the apex. Anther normal; pollinia 2, waxy. Pistillate flowers relatively large, fleshy, borne on short, arching, few-flowered racemes, nearly identical with those of *Cycnoches aureum*.

Mexico, Guatemala, Honduras, Costa Rica, Panama, Colombia, Peru, and Brazil.

CANAL ZONE: Balboa, *Powell 159;* lake shore along Gatún River valley, *Pittier 6802;* Gatún Lake and other low places, under 100 ft., *Powell s. n.* PANAMÁ: hills near city, sea level, *Powell s. n.* COCLÉ: El Valle de Antón, 1000 m., *Allen 3639;* floor of El Valle, 600 m., *Allen 3627*, 650 m., *Dunn s. n.;* El Valle Chiquito, 1800–2000 ft., *Allen 4500, 5080, 5162.* CHIRIQUÍ: without definite locality, 3000–3500 ft., *Powell 173.*

A frequent species, somewhat variable in the color of the male flowers and in the relative number, length, and termination of the apex of the marginal teeth of

the lip. Much has been made of these differences, but a considerable amount of field observation in Panama, Costa Rica, and Honduras, together with careful examination of the now fairly adequate collections, discloses that scarcely any two specimens are exactly alike in these characters, even within the limits of the so-called species. It is rather significant that most of these species have been described from single specimens, or from several inflorescences produced in cultivation probably from the same plant.

5. Cycnoches Tonduzii Schltr. in Fedde, Rep. Sp. Nov. Beih. 19:298. 1923.

Epiphytic herbs, the more robust plants usually found growing on decaying wood or where they have been fertilized in some manner. Pseudobulbs slender, often somewhat undulate, uniformly cylindric, tapering at the apex, 15–70 cm. tall and 2.5–4 cm. wide. Leaves distichous, broadly lanceolate, plicate, the blades ultimately deciduous, 15–45 cm. long and 2–10 cm. wide, the unarmed, persistent, grayish or greenish white, papery, closely imbricating bases tightly enveloping the stems. Inflorescences few to many, usually produced in succession from the upper leaf axils either while the leaves are present or after they have fallen. Flowers quite variable in size. Staminate and pistillate flowers identical in structure except for the column, usually produced on separate arching or pendent racemes. Staminate flowers those most frequently seen: sepals free, spreading, fleshy, green aging greenish yellow, the dorsal sepal erect, lanceolate to elliptic-lanceolate, acute, concave, 4–7 cm. long and 1–2 cm. broad, the tip often recurved, laterals spreading, subfalcate, acute, 4–6 cm. long and 1.5–2.5 cm. wide. Petals fleshy, spreading, elliptic-lanceolate, subfalcate, acute, green aging greenish yellow, 4–6 cm. long and 1.8–3.5 cm. broad. Lip shortly clawed at the base, ovate, obovate, or subcordate, 3.5–4 cm. long and 1.8–3.5 cm. wide, pure white, mid-portion very fleshy, strongly ventricose, the apex and lateral margins somewhat recurved, membranaceous; basal callus fleshy, dark green, triangular, acute, conspicuously projecting, surrounded by a dark green lunate depression. Column very slender, arcuate, 2.2–3.5 cm. long, terete, the apex dilated and rather triangular in cross-section; anther normal; pollinia 2, waxy. Pistillate flowers relatively infrequent, usually 2–4 on short arching racemes, identical with the staminate form except for the column: column stoutly arcuate, 2–2.5 cm. long and 5–6 mm. in thickness at the terete mid-portion, dilated and truncate at the apex, with a triangular or auriculate fleshy wing on each side of the normal stigma.

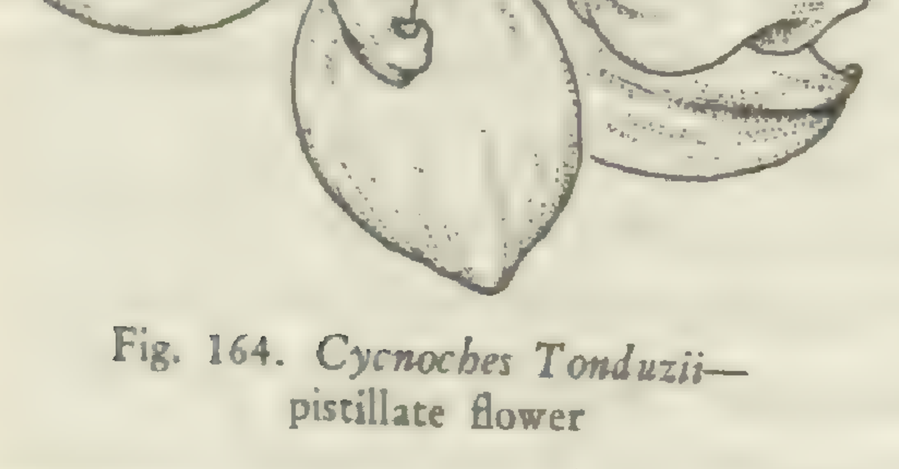


Fig. 164. *Cycnoches Tonduzii*—pistillate flower

Costa Rica and Panama.

COCLÉ: El Valle de Antón, lower portion of the valley and marshes along the Río Antón, 500 m., *Hunter & Allen 433*. VERAGUAS: vic. Río Tabasará, on large trees in open pastures, 100 m., *Allen 3913, 3914, 3915, 3979*. CHIRIQUÍ: Río Tabasará, 50 m., *Allen 2930;* Concepción, 1000 ft., *Allen 5154;* vic. Gualaca, 500 ft., *Allen 5153;* vic. Progreso, 1000 ft., *Dunn s. n.;* vic. Dolega, 1000 ft., *Dunn s. n.;* same locality, *Powell 3497*.

Fig. 165. *Cycnoches Tonduzii*

The species is quite variable in regard to size of plant, size of flower, and in the relative length and width of the lip. The larger-flowered forms are among the most attractive of all orchids, combining delicacy of color with exquisite form and fragrance.

The identity of this frequent and attractive species of western Panama and Costa Rica is a controversial issue. The flowers differ from *Cycnoches ventricosum* in the much shorter basal claw and in the conspicuous triangular basal callus, and from *C. chlorochilon* in the uniformly smaller flowers, longer basal claw, lunate, not ovate obtuse depression below the basal crest, and the strongly ventricose lip. The name C. *Warszewiczii* of Reichenbach has been used, but all present evidence indicates that this name is referable to *C. chlorochilon*.

6. CYCNOCHES VENTRICOSUM Batem. Orch. Mex. et Guat. *t. 5, 40* (in part). 1837–42.

Erect epiphytic herbs. Plants typical of the genus. Staminate and pistillate flowers identical except for the column. Staminate flowers those most frequently seen: sepals and petals membranaceous, green aging greenish yellow, strongly reflexed. Lip white, with an elongate basal claw, ovate, acute, the fleshy mid-section strongly ventricose, usually without thinner lateral margins, the apex membranaceous. Basal callus broadly rounded, not projecting, the surrounding lunate, dark green blotch not depressed.

Mexico, Guatemala, Honduras, and Panama.

PANAMÁ: definite locality unknown, *Fairchild s. n.*

The citation of this species, which hitherto has been known only from Mexico and northern Central America, is based on flowers preserved in liquid from two plants flowering in the collection of Dr. Graham Fairchild. Dr. Fairchild was of the opinion that the plants had been collected originally in the lowlands of Veraguas Province.

49. COELIOPSIS Rchb. f.

COELIOPSIS Rchb. f. in Gard. Chron. 9. 1872.

Epiphytic herbs superficially resembling plants of *Acineta*. Pseudobulbs stout, ovoid or subcylindric, with 3–4 plicate, prominently veined, oblanceolate, acuminate leaves at the apex. Inflorescences short, pendent, dense, subcapitate racemes from the base of the pseudobulbs. Flowers few to about 15, waxy white. Sepals very fleshy, the dorsal sepal free, concave, arching over the column, laterals connate at the base, forming a conspicuous mentum. Petals much narrower than the sepals. Lip 3-lobed, the lateral lobes erect with spreading apices, mid-lobe rectangular or ovate, longer than broad, truncate or obtuse, strongly reflexed, with ciliate margins. Column short, subclavate, obtuse, winged. Anther terminal, operculate, imperfectly 2-celled; pollinia 2, waxy.

A monotypic genus of epiphytic orchids known only from Panama and Costa Rica.

1. COELIOPSIS HYACINTHOSMA Rchb. f. in Gard. Chron. 9. 1872.

Epiphytic herbs. Pseudobulbs stout, ovoid or subcylindric, often longitudinally wrinkled, 6.5–8.5 cm. long and 2.5–4 cm. wide, the base usually enveloped in 3–5 brown, papery, closely imbricating bracts, the apex truncate, unarmed, with 3–4 oblanceolate, acuminate, plicate, prominently veined leaves 30–50 cm. long and 2–7 cm. wide. Inflorescences 4–5 cm. long, pendent, subcapitate racemes produced from the base of the pseudobulbs, basal portion tightly enveloped in the papery brown, imbricating bracts. Flowers few to about 15. Sepals white, very fleshy, the dorsal sepal free, concave, ovate, acute, 18–20 mm. long and 9–12 mm. wide, arching over the column; laterals connate at the base, forming a conspicuous mentum, the apices spreading, obliquely lanceolate, acute, 20–22 mm. long and 10–12 mm. wide. Petals white, lanceolate, acute, 15–16 mm. long and 5–6 mm. wide. Lip 3-lobed, 1.6–1.8 cm. long and 1.2–1.4 cm. wide, white, the inner lip with an orange spot, lateral lobes erect, with spreading, ciliate, apical margins, mid-lobe rectangular or ovate, truncate or obtuse, strongly reflexed, with ciliate margins. Column short, 9–11 mm. long, subclavate, winged, obtuse, white with a small purple blotch at the base. Anther pure white.

Panama and Costa Rica.

PANAMÁ: Cerro Campana, cloud forest, 3000 ft., *Allen 5184*. COCLÉ: hills north of El Valle de Antón, about 1000 m., *Allen 2402*. CHIRIQUÍ: without definite locality, *Powell 423*.

A fairly frequent species in wet, intermediate, highland forests of Panama and Costa Rica.

49-A. ERIOPSIS Lindl.

ERIOPSIS Lindl. in Bot. Reg. n. s. 10: post *t. 9, t. 18*. 1847; Benth. & Hook. Gen. Pl. 3:545. 1883.

Pseuderiopsis Rchb. f. in Linnaea 22:852. 1849.

Epiphytic herbs with pyriform or elongate pseudobulbs, the apex usually with 2 broad, plicate, strongly veined leaves. Inflorescences erect or arching, unbranched racemes from the base of the pseudobulbs. Flowers few to many. Sepals subequal, spreading, free, or the laterals connate at the base, forming a short mentum with the foot of the column. Petals subequal to the sepals. Lip 3-lobed, the laterals erect, the mid-lobe small, spreading, entire or 2-lobed; base of lip attached to the foot of the column; disk lamellate. Column elongate, semiterete, somewhat arcuate, dilated or subclavate but not winged; base produced into a short foot. Anther terminal, operculate, incumbent, 1-celled; pollinia 2 or 4, waxy.

A small genus of epiphytic highland orchids ranging from Costa Rica to Peru and Brazil. A single species is known to occur in Panama, the few plants found to date all unfortunately being sterile. This species is, however, sufficiently distinctive even when not in flower to be cited without hesitation.

1. Eriopsis rutidobulbon Hook. in Bot. Mag. *t. 4437*. 1849.

Epiphytic herbs with stout, pyriform pseudobulbs which are nearly black and covered with innumerable fine wrinkles, the apex with 2–3 broadly lanceolate, acute or shortly acuminate, subcoriaceous, plicate, strongly veined leaves. Inflorescences erect or arching, unbranched racemes 30–45 cm. long, produced from the base of the pseudobulbs. Flowers few to many. Sepals subequal, free, spreading, dull orange-yellow with red-purple margins, the dorsal sepal linear-lanceolate, obtuse or shortly acute, 1.6–1.8 cm. long and .5–.6 cm. wide, laterals elliptic-lanceolate, acute, 1.6–1.8 cm. long and .5–.6 cm. wide. Petals subequal to the sepals, similarly colored, lanceolate, acute, 1.5–1.7 cm. long and .35–.4 cm. wide. Lip 3-lobed, 1.5–1.8 cm. long and .9–1.1 cm. wide when spread out, the lateral lobes rounded, dull orange-red spotted dark purple, the mid-lobe spreading, emarginate or 2-lobed at the apex, white spotted dark purple; disk with erect fleshy keels. Column 9–11 mm. long, subclavate, somewhat arcuate, greenish.

Panama, Colombia, and Peru.

Sterile plants of what in all probability are this species have been seen in recent years in Chiriquí Province at about 6000 ft. elevation, and more frequently in the wet forested region north of El Valle de Antón, in Coclé. It seems to be a rare plant.

50. SIEVEKINGIA Rchb. f.

Sievekingia Rchb. f. Beitr. Syst. Pfl. 3. 1871.

Epiphytic herbs, with pseudobulbs ovoid or subcylindric, monophyllous or rarely diphyllous at the apex. Leaves plicate, lanceolate or elliptic-lanceolate, acute, or shortly acuminate. Inflorescences short or elongate, pendent or rarely arching racemes from the base of the pseudobulbs. Flowers few to many. Sepals free, concave, spreading, subequal. Petals subequal to the sepals but usually narrower. Lip rhombic to ovate, or obovate-triangular, the lateral margins erect, the apex usually acute and spreading; disk with erect lamellae, or basal, elongate, denticulate processes. Column subarcuate, broadly winged or dilated. Anther terminal, operculate; pollinia 2, waxy.

A small genus of American epiphytic orchids ranging from Costa Rica to British Guiana and Colombia to Ecuador and Peru. They are seldom collected, perhaps because they are often mistaken for immature *Stanhopea* seedlings. A single species has been found in Panama.

1. Sievekingia suavis Rchb. f., Beitr. Syst. Pfl. 3. 1871.

Dwarf epiphytic herbs. Pseudobulbs ovate, somewhat angulate, 1.5–3 cm. tall and 1.0–1.5 cm. wide, sheathed at the base in 2–3 papery bracts, the apex with

a single lanceolate or elliptic-lanceolate, acute or shortly acuminate, plicate, subcoriaceous leaf 8–25 cm. long and 1.5–3.2 cm. wide. Inflorescences short, pendent racemes produced from the base of the pseudobulbs. Flowers about 6 or fewer. Sepals subequal, free, spreading, pale lemon-yellow, dorsal sepal concave, elliptic-lanceolate, acute, 10–17 mm. long and 4–8 mm. wide; laterals concave, elliptic-lanceolate, acute, 12–17 mm. long and 4–8 mm. wide. Petals orange, lanceolate, acute, 10–15 mm. long and 3–6 mm. wide. Lip ovate or obovate-rhombic when spread out, 8–11 mm. long and 6–10 mm. wide, orange with reddish purple spots, subnavicular, the lateral margins erect, the apex acute and spreading; disk with 3 prominent or obscure, erect keels, the central keel prolonged and terminating in an inconspicuous 2-lobed scale. Column somewhat arcuate, 6–8 mm. long, green, broadly winged, the wings orange.

Costa Rica and Panama.

COLÓN: Cativo-Porto Bello trail, sea level, *Powell 379;* Río Llano Sucio, vic. Puerto Pilón, 100 m., *Butcher s. n.* (under *Allen 2841*).

Apparently a rare species. The Panama specimens are consistently smaller in all respects than those seen from Costa Rica, but other than in size there seem to be no differences.

51. KEGELIELLA Mans.

KEGELIELLA Mans. in Fedde Rep. Sp. Nov. 36:60. 1934.

Kegelia Rchb. f. in Bot. Zeit. 10:670. 1852.

Small epiphytic herbs, the plants considerably resembling those of a small *Gongora* or *Stanhopea*. Pseudobulbs ovoid, somewhat compressed, angulate, the apex with 2–3 broadly elliptic-lanceolate, acute, plicate leaves. Inflorescences pendent racemes from the base of the pseudobulbs, the rachis densely covered with glandular hairs. Flowers relatively small, about 6 or fewer. Sepals subequal, free, spreading, lanceolate or elliptic-lanceolate, acute or acuminate, covered with glandular hairs on the outer surfaces. Petals subequal to the sepals but narrower and shorter, lanceolate or oblanceolate, acute or acuminate. Lip membranaceous or fleshy, 3-lobed, the lateral lobes large, spreading or erect, obliquely angulate and subdolabriform when spread out, or broadly ovate and subtruncate toward the basal claw, mid-lobe small, subcordate or triangular, concave or flat, separated from the laterals by emarginate sinuses or plicate folds; disk with an erect, fleshy, laterally compressed or carinate, dorsally 1- or 2-sulcate, 2-lobed or acute linguiform callus. Column elongate, more or less arcuate, slender below, broadly winged above, without a foot. Anther terminal, operculate, incumbent, 1-celled. Rostellum elongate, the apex obcordate or acuminate; pollinia 2, waxy.

An extremely rare genus of American epiphytic orchids previously known from a few specimens collected in Costa Rica, Jamaica, Trinidad, and Surinam. Two species have been described, both of which have been found in Panama.

a. Lip membranaceous; apical lobe flat, spreading, conspicuously separated from the lateral lobes by marginal sinuses..... 1. K. HOUTTEANA

aa. Lip fleshy; apical lobe concave, confluent with the laterals, separated only by plicate folds..... 2. K. KUPPERI

1. KEGELIELLA HOUTTEANA (Rchb. f.) L. Wms. in Ann. Mo. Bot. Gard. 29:347. 1942.

Kegelia Houtteana Rchb. f. in Bot. Zeit. 10:670. 1852.

Dwarf epiphytic herbs, with ovoid, laterally compressed, somewhat angulate pseudobulbs 1.5–2 cm. long and 1–1.5 cm. wide, the apex with 3 broadly elliptic-lanceolate, acute, plicate leaves 9–13 cm. long and 3.5–5 cm. wide. Inflorescences pendulous racemes about 10 cm. long from the base of the pseudobulbs, the rachis densely covered with minute reddish glandular hairs. Flowers few, relatively small. Sepals membranaceous, subequal, free, concave, spreading, pale yellow, the outer surfaces with minute reddish glandular hairs, dorsal sepal lanceolate, acuminate, 12–15 mm. long and 3–4 mm. wide, laterals elliptic-lanceolate, acuminate, 14–16 mm. long and 4–5 mm. wide. Petals lanceolate, acuminate, pale yellow barred red, 11–12 mm. long and 1.5–2.5 mm. wide. Lip 3-lobed, membranaceous, yellow, 9–11 mm. long and 5–7 mm. wide when spread out, lateral lobes erect, obliquely angulate or subdolabriform when spread out, mid-lobe triangular or subcordate, flat, spreading, separated from the laterals by emarginate sinuses; disk with an erect, fleshy, laterally compressed, more or less 2-lobed linguiform callus. Column 10–12 mm. long, somewhat arcuate, apple-green, slender below, broadly winged above. Anther yellow.

Panama, Jamaica, Trinidad, and Surinam.

COCLÉ: region north of El Valle de Antón, vic. of La Mesa, 1000 m., *Allen 2759*.

Sterile plants of what may also be this species have been recently collected on the upper wet forested slopes of mountains west of Santa Fé, in Veraguas. Apparently rare.

2. KEGELIELLA KUPPERI Mansf. in Fedde Rep. Sp. Nov. 36:60. 1934.

Small epiphytic herbs with ovoid, somewhat compressed and angulate pseudobulbs 2–3 cm. long and 1–2 cm. wide, the apex with 2 elliptic-lanceolate, acute, plicate leaves 4–8 cm. long and 1.5–3 cm. wide. Inflorescences pendent racemes 9–12 cm. long, produced from the base of the pseudobulbs, the rachis densely covered with minute brown glandular hairs, at least above. Flowers relatively small, from solitary to about 6. Sepals membranaceous, subequal, free, spreading, concave, the outer surfaces densely covered with minute glandular hairs, dorsal sepal lanceolate, acuminate, 16–18 mm. long and 5–6 mm. wide, laterals elliptic-lanceolate, acuminate, 1.7–1.9 cm. long and .6–.65 cm. wide. Petals oblanceolate, acute or acuminate, 1–1.3 cm. long and 3–3.2 mm. wide. Lip 3-lobed, fleshy, the lateral lobes large, rounded, spreading, mid-lobe small, subcordate, concave, separated from the lateral lobes by plicate folds; disk with an erect, fleshy, carinate,

acute, linguiform callus. Column 10–12 mm. long, somewhat arcuate, slender below, broadly winged above.

Costa Rica and Panama.

COLÓN: Quebrada López, slopes of Cerro Santa Rita, 100 ft., *Butcher s. n.* (under *Allen 2108*).

This is apparently the second collection of this exceedingly rare species.

52. ACINETA Lindl.

ACINETA Lindl. in Bot. Reg. Misc. n. s. 6:67. 1843; Benth & Hook. Gen. Pl. 3:551. 1883; Schltr. in Orchis 11:21–48. 1917.

Neippergia C. Morr. in Ann. Soc. Roy. Agr. & Bot. Gand 5:375, *t. 282*. 1849.
Lueddemannia Rchb. f. in Bonplandia 2:281. 1854.
Luddemania Rchb. f. in Linden, Pescatorea 1, *t. 22*. 1860.
Luedemannia Benth. in Benth. & Hook. Gen. Pl. 3:552. 1883.

Stout epiphytic herbs with ovoid or subcylindric, often laterally compressed or furrowed pseudobulbs, the apex with 1–4 broadly plicate leaves, the plants considerably resembling a robust *Stanhopea*. Inflorescences elongate, pendulous or erect racemes from the base of the pseudobulbs. Flowers usually many, fleshy, relatively large and conspicuous. Sepals subequal, broadly concave, the dorsal sepal free, the laterals usually connate at the base. Petals subequal to the sepals but usually smaller. Lip 3-lobed, fleshy, concave, with a concave or subsaccate, basal claw or hypochile, lateral lobes large, erect, triangular or subreniform, the apical lobe carinate, concave or spreading; disk fleshy, with variously shaped appendages. Column erect, usually pubescent, somewhat arcuate, subclavate or narrowly winged, without a foot. Anther terminal, operculate, incumbent, 1-celled or imperfectly 2-celled; pollinia 2, waxy.

A genus of robust American epiphytic orchids ranging from southern Mexico to Venezuela and Ecuador. Vegetatively they often considerably resemble a stout *Stanhopea*, but are most closely allied to *Peristeria*, although the complex structure of the lip in some species more nearly approaches that found in the former genus.

Schlechter in his monograph distinguishes 13 species, the major separations in his key being based on color. No attempt has been made to evaluate these specific concepts, except that *Acineta chrysantha* and *A. sella-turcica* seem to be one entity on the basis of the evidence now available. Of the two valid species that have been listed for Panama, only one, *A. chrysantha*, has been found in recent years. However, the wide distribution of *A. superba* in adjacent Colombia would increase the possibility that it has been, or will be found in Panama.

a. Lip in profile with a broadly emarginate indentation or constriction below the lateral lobes, separating the hypochile from the epichile, the basal claw or hypochile subsaccate; apical lobe of the lip about 1 cm. long ..... 1. A. CHRYSANTHA

aa. Lip in profile deeply gibbous and continuous, without an emarginate indentation below the lateral lobes; basal claw or hypochile rectangular-concave, not subsaccate; apical lobe of the lip about 2 cm. long ..... 2. A. SUPERBA

1. Acineta chrysantha (Morr.) Lindl. & Paxt. in Paxton's Flow. Gard. 1:31. 1850–51.

Neippergia chrysantha C. Morr. in Ann. Soc. Roy. Agr. & Bot. Gand 5:375, *t. 282*. 1849.
Acineta densa Lindl. & Paxt. in Paxton's Flow. Gard. 1:91. 1850–51.
Acineta sella-turcica Rchb. f. in Bot. Zeit. 10:705. 1852.
Acineta Warscewiczii Kl. in Allgem. Gartenzeit. 20:145. 1852.

Robust epiphytic herbs with ovoid or subconic, somewhat laterally compressed, more or less furrowed pseudobulbs 8–10 cm. long and 6–8 cm. wide, the apex with 3–4 broad, oblanceolate, plicate, acute leaves 30–45 cm. long. Inflorescences elongate, pendulous racemes from the base of the pseudobulbs. Flowers many, fleshy, not fully expanding, subglobose, relatively large and conspicuous. Sepals fleshy, free, not spreading, yellow, concave, dorsal sepal oblong-ovate, obtuse, 2.5–3.5 cm. long and 2–2.7 cm. wide, laterals elliptic-ovate, shortly and broadly acute, 2.5–3.5 cm. long and 2–2.8 cm. wide. Petals membranaceous, obovate, acute, yellow, spotted red particularly toward the base or on the margins, 3–3.2 cm. long and 1.8–2 cm. wide. Lip very fleshy, 3-lobed, 2.5–3 cm. long and 2.5–3 cm. broad when spread out, yellow spotted red-brown, the basal claw or hypochile broadly concave or subsaccate, terminating in a short, erect, fleshy horn; lateral lobes erect, subreniform; apical lobe short, concave or spreading, subquadrate or rhombic-obovate, acute, 8–12 mm. long and 8–12 mm. wide; disk with a broad, erect, prominent callus with 2 small, lateral, subfalcate wings, the projecting carinate, apical margin with short fleshy teeth. Column stout, pubescent, 2–2.2 cm. long, the base semiterete, the apex with narrow lateral wings.

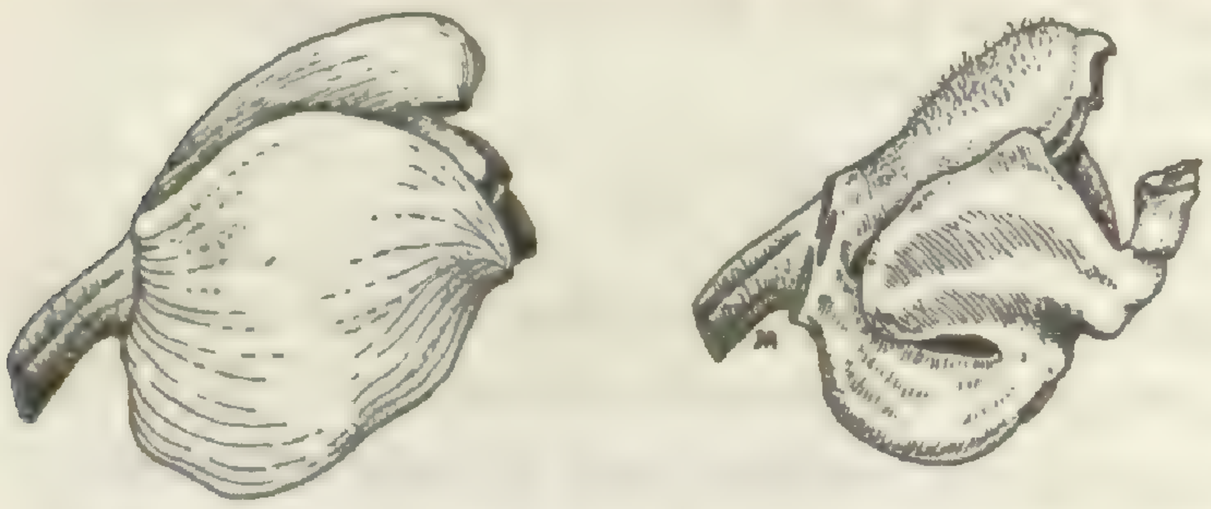


Fig. 166. *Acineta chrysantha*

Costa Rica and Panama.

Chiriquí: Indian Hill, 5000 ft., *Powell 314, 417;* without definite locality, *Pring s. n.*

Our specimens seem to differ in minor detail, particularly in the basal fleshy callus of the disk and in the upper margin of the clinandrium, from typical material of this species; but in spite of these discrepancies, they seem to compare more nearly to *A. chrysantha* than to any other.

2. Acineta superba (HBK.) Rchb. f. in Walp. Ann. 6:609. 1863.

Anguloa superba HBK. Nov. Gen. & Sp. 1:343, *t. 93*. 1815.
Peristeria Humboldti Lindl. in Bot. Reg. n. s. 6: *t. 18*. 1843.
Acineta Humboldtii Lindl. loc. cit. Misc. 68. 1843.
Acineta fulva Kl. in Allgem. Gartenzeit. 20:146. 1852.
Acineta Colmani Hort. ex Gard. Chron. III, 35:173. 1904.

Stout epiphytic herbs with ovoid, somewhat angular pseudobulbs 7–10 cm. long and 4–6 cm. wide, the apex with 2–3 lanceolate, acute, plicate leaves 25–45 cm. long. Inflorescences elongate, pendent racemes from the base of the pseudobulbs. Flowers about 5 to numerous, fleshy, relatively large and conspicuous, not fully expanding, variable in color from pale yellow to reddish brown, with red or brownish purple spots. Sepals fleshy, concave, the dorsal sepal free, more or less erect, oblanceolate, shortly acute, 3.5–4 cm. long and 2–2.2 cm. wide, laterals connate at the base, obliquely elliptic-lanceolate, acute, 3.5–4 cm. long and 2–2.5 cm. wide. Petals membranaceous, oblanceolate-obtuse or very shortly and broadly acute, 3–3.5 cm. long and 1.8–2 cm. wide. Lip very fleshy, gibbous, 3-lobed, the basal claw or hypochile rectangular-linear, concave, the lateral lobes erect, broadly

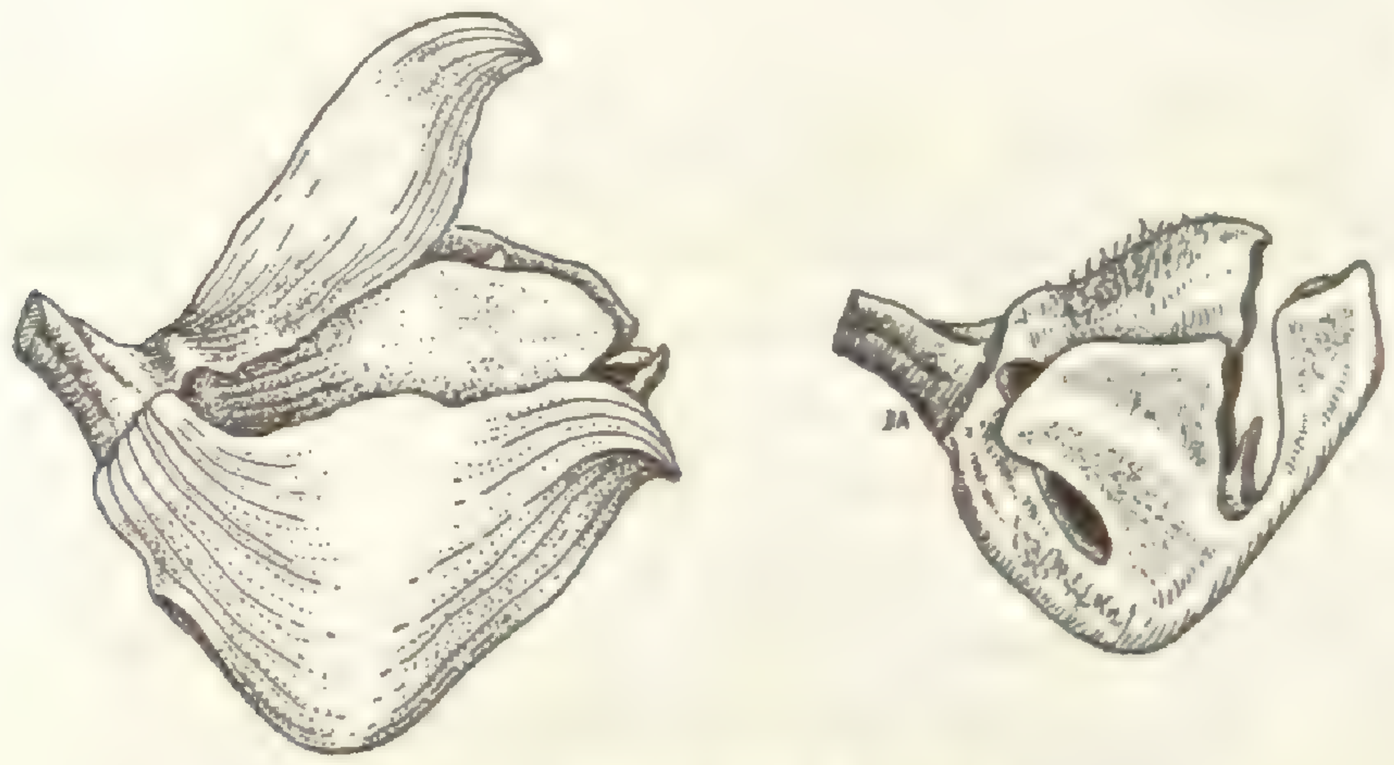


Fig. 167. *Acineta superba*

triangular, the apical lobe of the lip elongate, carinate, 1.8–2 cm. long and about 1.8–2 cm. wide when spread out, obovate, obtuse; disk with a very conspicuous, erect, oblong-quadrate, fleshy callus with 2 identical, divergent, forked processes arising from a common restricted base, the one pointing toward the apex and the other toward the base of the lip. Column stout, pubescent, 1.8–2 cm. long and 1.3–1.5 cm. wide, subterete below, narrowly winged above, the wings confluent at the apex, forming a hood over the clinandrium.

Panama?, Colombia, Venezuela, and Ecuador.

This species was first discovered by Humboldt and Bonpland in a valley called Catacocha, near Zaruma, in what is now Ecuador. It is doubtfully listed by Schlechter for Panama, although he evidently had not seen authentic specimens, nor have any been available for the preparation of this manuscript. However, its wide distribution in adjacent Colombia and northern South America would strengthen the probability that it has been found, or will be found within the limits of our area.

53. PERISTERIA Hook.

Peristeria Hook. in Bot. Mag. *t. 3116.* 1831; Benth. & Hook. Gen. Pl. 3:550. 1883.

Peristera Endl. Gen. Pl. 199. 1837.
Eckardia Rchb. ex Endl. Gen. Pl. Suppl. 2:17. 1842.

Epiphytic or terrestrial herbs, with stout ovoid or subconic pseudobulbs, the apex with 1–5 broad, elliptic-lanceolate, plicate leaves which are often deciduous. Inflorescences tall erect or short pendent racemes from the base of the pseudobulbs. Flowers fleshy, subglobose, relatively large and conspicuous. Sepals fleshy, subequal, broadly concave, the dorsal sepal usually free, the laterals somewhat connate at the base. Petals subequal to the sepals, but smaller. Lip very fleshy, with a broadly concave basal claw or hypochile which is adnate to or continuous with the base of the column, with or without a fleshy central callus, with or without elongate, erect, lateral wings; apical portion or epichile entire, articulated with the hypochile, inflexed or incumbent, lateral margins erect, spreading or retuse; disk with or without a fleshy ventricose or 2-keeled callus. Column erect, short, stout, subterete, without a foot, with or without elongate lateral projections. Anther terminal, operculate, incumbent, imperfectly 2-celled; pollinia 2, waxy.

About six species of robust epiphytic or terrestrial herbs ranging from Costa Rica and Panama to Surinam and Peru. The single terrestrial species, *Peristeria elata*, is the only member of the genus known to occur in Panama. All the others are South American epiphytes with pendent flower scapes reminiscent of *Acineta*.

1. Peristeria elata Hook. in Bot. Mag. *t. 3116.* 1831.

Erect, stately, terrestrial herbs. Pseudobulbs stout, fleshy, broadly ovoid, subconic or subcylindric, 4–12 cm. long and 4–8 cm. wide, the bases enveloped in several closely imbricating papery bracts, the upper 1–2 of which are foliaceous, the apex of the pseudobulb with 3–5 broadly lanceolate, plicate, acuminate, deciduous leaves 3–10 dm. long and 6–12 cm. wide; the old pseudobulbs often wrinkled, the brown, papery, imbricating, unarmed bases of the fallen leaves persistent and enveloping the apex. Inflorescences tall, solitary, erect, unbranched racemes 8–13 dm. long, produced simultaneously beside the new growth at the base of the pseudobulbs and developing concurrently with it, actual flowering being delayed until the pseudobulb has matured but before the leaves have fallen. Flowers 10–15 or more, relatively large and conspicuous, fleshy, subglobose, waxy white, strongly fragrant, opening in succession from the lowest upward, 2–4 on the raceme open at one time, relatively widely spaced, with long (about 4 cm.) pedicels, usually subtended on the scape by several to many of the developing seed capsules; the unopened buds above the flowers progressively more crowded toward the apex of the scape. Sepals subequal, fleshy, waxy white, broadly concave, the dorsal sepal free, ovate, obtuse, 2.5–3 cm. long and 2–2.5 cm. broad, laterals somewhat connate at the base, ovate or suborbicular, shortly acute, 2.5–3 cm. long and 2.5–3 cm. wide. Petals elliptic-obovate, obtuse, 20–25 mm. long

Fig. 168. *Peristeria elata*

and 15–18 mm. wide. Lip very fleshy, the claw or hypochile broad, continuous with the base of the column, the lateral margins with ascending wings which are white, heavily spotted rose-red, the inner basal surface thickened into a fleshy lobule; apical lobe of the lip, or epichile, white, articulated with the frontal margin of the hypochile, entire, subquadrate, retuse, nearly truncate, with a central glabrous, fleshy, pure white, ventricose or suborbicular crest. Column short, pure white, subconic, semiterete, 9–11 mm. long. Anther pure white, beaked, superficially resembling the head of a bird.

Costa Rica, Panama, Colombia, and Venezuela.

PANAMÁ: hills near Juan Díaz, sea level, *Powell 213;* without definite locality, *Pring s. n.;* llanos east of Panama City near Río Tecúmen, 100 ft., *Allen 5144;* Chorrera llanos, 50 ft., *Allen 5145;* Cerro Campana, rocky outcrops, 2000 ft., *Allen 5071.* COLÓN: Cerro Santa Rita, in grass along roads, 1200 ft., *Dorothy Allen 5138.* COCLÉ: El Valle de Antón, 1800 ft., *Allen 5072.*

This handsome species is the famous "Holy Ghost" or "Dove Orchid," the national flower of the Republic of Panama. The popular names are suggested by the form of the column, its beaked anther and the lateral winged lobes of the basal claw combining to produce within the waxy white flower a figure resembling that of a dove. The plants are found at low to medium elevations in shaded situations on the margins of grasslands and on rocky outcrops in forest, having been in former times very plentiful in the Canal Zone area. Commercial collecting has now made this an increasingly infrequent plant of the more inaccessible parts of the interior.

54. NEOMOOREA Rolfe

NEOMOOREA Rolfe, in Orch. Rev. 12:30. 1904.

Moores Rolfe, in Gard. Chron. III, 8:7. 1890, non Lem.

Epiphytic herbs with stout ovoid pseudobulbs, the apex with 2 elliptic-lanceolate, acute or shortly acuminate, plicate leaves, the plants resembling a very robust *Stanhopea*. Inflorescences erect or arching racemes from the base of the pseudobulbs. Flowers relatively large and conspicuous. Sepals subequal, free, spreading. Petals subequal to the sepals but narrower at the base. Lip deeply 3-lobed, articulated to the foot of the column, lateral lobes large, spreading, subreniform, midlobe concave, lanceolate-acuminate, basal crest shortly pedicellate, with 2 lateral erect or spreading wings. Column subclavate, semiterete, somewhat arcuate, not winged, produced at the base into a short, broad foot. Anther terminal, incumbent, operculate; pollinia 4, waxy, in 2 unequal pairs.

A rare monotypic genus, previously known only from Colombia.

1. NEOMOOREA IRRORATA Rolfe, in Orch. Rev. 12:30. 1904.

Moorea irrorata Rolfe, in Gard. Chron. III, 8:7. 1890.

Erect epiphytic herbs; the primary roots with many erect, white, spinous secondary rootlets which form a dense mat about the base of the plant. Pseudobulbs stout, ovoid, laterally compressed, furrowed, 4–11 cm. long and 2.5–6 cm. wide, the apex with 2 elliptic-lanceolate, plicate, acute or shortly acuminate, strongly veined, subcoriaceous leaves 45–75 cm. long and 10–13 cm. wide. Inflorescences erect or arching racemes 15–45 cm. long, from the base of the pseudobulbs. Flowers few to about 12, relatively large and conspicuous. Sepals subequal, free, spreading, concave, reddish brown, the bases white, the dorsal sepal elliptic-lanceolate, acute, 2–2.5 cm. long and 1–1.2 cm. wide, laterals elliptic-ovate, acute, 2.2–2.8 cm. long and 1.6–1.8 cm. wide. Petals elliptic-obovate, acute, reddish brown with a white base, 2.2–2.5 cm long and 1.2–1.4 cm. wide. Lip deeply 3-lobed, articulated to the short column foot, 1.4–1.6 cm. long and 1.5–1.7 cm. wide when spread out, lateral lobes large, spreading, subreniform, pale yellow, banded and marked with brownish purple, mid-lobe concave, lanceolate-acuminate, pale yellow spotted red; basal crest conspicuous, erect, shortly pedicellate, with two lateral, erect, subfalcate wings. Column subclavate, somewhat arcuate, not winged, 12–14 mm. long, the base with a short, broad foot.

Panama and Colombia.

CANAL ZONE (?): exact locality unknown, probably Gatún Lake or the vicinity of Río Trinidad, *Hunter s. n.*

A rare Colombian species known in Panama from a few collections of sterile plants from the vicinity of the Río Trinidad, on Gatún Lake, and a single flowering specimen collected and photographed by Mr. A. A. Hunter.

54-A. POLYCYCNIS Rchb. f.

POLYCYCNIS Rchb. f. in Bonplandia 3:218. 1855; Benth. & Hook. Gen. Pl. 3:553. 1883.

Erect epiphytic herbs, the plants somewhat resembling a *Stanhopea*. Pseudobulbs ovoid or subcylindric, the bases enveloped in sheathing bracts, the apex with 1–3 broadly elliptic-lanceolate, plicate leaves. Inflorescences elongate, arching or pendulous racemes from the base of the pseudobulbs. Flowers numerous, membranaceous, pedicellate, somewhat reminiscent of those of a *Gongora*. Sepals subequal, narrowly elliptic-lanceolate, free, or the laterals connate at the base, spreading or reflexed. Petals subequal to the sepals but narrower, sometimes with an elongate, substipitate base. Lip usually with a 3-lobed basal claw or hypochile which is adnate to the base of the column, the lateral lobes erect or spreading, the apex usually hirsute or pubescent; the base of the epichile inserted on the under-surface of the hypochile well back of the apex, producing the effect in some species of a double lip; epichile entire or obscurely 3-lobed, subcordate, obovate or lanceolate, obtuse, acute or acuminate, lateral lobes, if present, subauriculate and spreading; disk often hirsute or pubescent. Column slender, footless, elongate, arcuate, terete below, dilated and truncate above. Anther terminal, operculate, incumbent, 1-celled; pollinia 2, waxy.

Fig. 169. *Polycycnis barbata*

About 7 species of American epiphytic herbs, ranging from Costa Rica to Brazil and Peru, only one being thus far known from Panama. *Polycycnis gratiosa* Rchb. f., from adjacent Costa Rica, seems to differ from our species only in the somewhat smaller flowers and the subfalcate, rather than obtuse, lateral auricles of the hypochile, characters scarcely warranting specific segregation. For the purposes of this treatment they are considered as being identical.

1. POLYCYCNIS BARBATA (Lindl.) Rchb. f. in Bonplandia 3:218. 1855.

Cycnoches barbatum Lindl. in Jour. Hort. Soc. Lond. 4:268. 1849.
Polycycnis gratiosa Endres & Rchb. f. in Gard. Chron. 1451. 1871.

Epiphytic herbs with ovoid, ridged pseudobulbs 2.5–4.5 cm. long and 1.8–2.5 cm. wide, bearing at the apex a single elliptic-lanceolate, plicate, acute or acuminate leaf 25–40 cm. long and 4–10 cm. wide. Inflorescences arching or pendent racemes 28–32 cm. long, from the base of the pseudobulbs, the rachis minutely pubescent. Flowers many, membranaceous, relatively large, on elongate pubescent pedicels. Sepals subequal, spreading or reflexed, concave, pale translucent yellow spotted red, the dorsal sepal free, lanceolate-acuminate, 17–25 mm. long and 6–8 mm. wide when spread out, laterals somewhat obliquely lanceolate, acuminate, connate at the base, 18–24 mm. long and 6–8 mm. wide. Petals narrowly oblanceolate, with slender substipitate bases, pale translucent yellow spotted red, 18–24 mm. long and 2.5–3 mm. wide. Lip with a 3-lobed basal claw or hypochile adnate to the base of the column, white spotted red, 7–9 mm. long, the lateral lobes auriculate-obtuse or subfalcate, acute, erect; the apex of the hypochile with a central, densely pubescent, carinate projection; epichile obscurely 3-lobed, white spotted purple, ovate, acuminate, lateral lobes subauriculate and spreading; the base of the epichile inserted about midway on the under-surface of the hypochile, producing the effect of a double lip, one slightly above and behind the other; disk densely pubescent. Column slender, green, footless, arcuate, terete below, dilated and truncate above, 1.8–2.2 cm. long. Anther purple.

Costa Rica, Panama, Colombia, Venezuela, and Brazil.

COCLÉ: crest of Cerro Pajita, hills north of El Valle de Antón, 3600 ft., *Allen 4314*.

55. STANHOPEA Frost ex Hook.

STANHOPEA Frost ex Hook. in Bot. Mag. *t. 2948, 2949.* 1829; Benth. & Hook. Gen. Pl. 3:549. 1883.

Ceratochilus Lindl. in Lodd. Bot. Cab. 15: *t. 1414.* 1828, non Blume.
Stanhopeastrum Rchb. f. in Bot. Zeit. 10:927. 1852.

Epiphytic herbs with ovoid or subcylindric, more or less ridged pseudobulbs, the apex with a single broad, petiolate, plicate, strongly veined, elliptic-lanceolate leaf. Inflorescences short, pendulous racemes from the base of the pseudobulbs, the rachis enveloped in several broad, papery, imbricating bracts. Flowers usually

large, conspicuous, 2 to about 9, on long pedicels, each shielded by a broad, papery, spathaceous bract. The genus is divided into two very distinct sections, Ecornuta and Eustanhopea, based on the structure of the lip. In both sections sepals membranaceous and concave, the dorsal sepal free and erect, the laterals broader, reflexed and connate at the base. Petals membranaceous, subequal to the dorsal sepal, but usually narrower, with undulate margins. In Ecornuta: lip essentially simple and undivided, adnate to the base of the column, with an inflated, very fleshy, saccate or calceiform, basal claw or hypochile, surmounted by a much-reduced and confluent apical lobe. In Eustanhopea: fleshy lip complexly 2- or 3-parted, inserted on the base of the column, usually divided into a subsaccate or cymbiform, basal claw or hypochile, with or without short, broad teeth on the inner margins of the basal concavity; a short mid-section or mesochile sometimes simple but more frequently with short or elongate, usually falcately incurved, acuminate, lateral horns, and an apical lobe or epichile which usually is articulated to the apex of the mesochile, entire and spreading, or 3-lobed and variously shaped. In both sections column elongate, somewhat arcuate, with or without broad lateral wings. Anther terminal, operculate, incumbent, 1-celled; pollinia 2, waxy.

A remarkable genus mostly of large-flowered American epiphytes, ranging from southern Mexico to Peru and Brazil. Many species have been described, often based on inadequate dried material or isolated specimens flowering in European greenhouses. Undoubtedly comparison of type material would reduce the present inflated list of names to about eight valid species. So far as can be determined from available material, four entities have been found thus far in Panama.

a. Lip simple, undivided (Section Ecornuta) ..... 3. S. pulla
aa. Lip complexly 3-parted (Section Eustanhopea)
  b. Hypochile cymbiform, broadly elliptic-lunate in profile, distinctly longer than broad, the inner margins of the basal concavity entire.... 2. S. oculata
  bb. Hypochile inflated, saccate or subsaccate, geniculate or broadly obovate in profile, about as long as broad, or scarcely longer, the inner margins of the basal concavity with short, broad teeth.
    c. Hypochile in profile geniculate, somewhat longer than broad, the apex oblique, the lateral margins of the canal closely appressed..... 4. S. Wardii
    cc. Hypochile in profile obovate, not geniculate, about as broad as long, the apex abruptly truncate and concave, the lateral margins of the canal spreading ..... 1. S. graveolens

1. Stanhopea graveolens Lindl. in Bot. Reg. n. s. 3: Misc. 59. 1840.
Stanhopea Warscewicziana Kl. in Allgem. Gartenzeit. 20:214. 1852.
Stanhopea inodora Rchb. f. Xenia Orch. 1:121. 1858, non Lodd.
Stanhopea costaricensis Rchb. f. in Hamb. Gartenzeit. 16:424. 1860.
Stanhopea oculata var. *constricta* Klinge. in Acta Hort. Petropol. 17:15, *t. 3, fig. 26–27.* 1898.

Erect epiphytic herbs, with ovoid, ridged, subconic pseudobulbs 2.5–4 cm. long and 2–3 cm. wide, the apex with a single firm, lanceolate to elliptic-lanceolate,

plicate, acute leaf 28–60 cm. long and 7–11 cm. wide. Inflorescences short, pendulous, from the base of the pseudobulbs, the rachis enveloped in several papery, spathaceous bracts. Flowers large and conspicuous, very fragrant, white, pale yellow, or yellow with reddish brown or purple dots, the sepals and petals often with more or less circular rings, the base of the hypochile with or without 2 lateral dark purple "eyes" or blotches. Sepals membranaceous, the dorsal sepal free, erect, concave, lanceolate, acute, 6–7.5 cm. long and 1.4–1.6 cm. wide, laterals reflexed, connate at the base, elliptic-lanceolate, acute, 6–7.5 cm. long and 2–3 cm. broad. Petals membranaceous, reflexed, with undulate margins, lanceolate, acute or acuminate, 4.5–5.5 cm. long and 1.0–1.8 cm. wide. Lip fleshy, complexly 3-parted, 5–6 cm. long, the hypochile broadly inflated, obovate in profile, not geniculate, abruptly truncate and concave at the apex, about as broad as long, the lateral margins with broadly falcate thickenings, the canal to the basal concavity ample, the margins not closely appressed; mesochile short, inserted on the concave apex of the hypochile, the lateral margins with 2 elongate, falcate, acuminate, incurved horns; epichile articulated with the apex of the mesochile, elliptic-ovate, acute or apiculate, with more or less reflexed margins. Column elongate, arcuate, terete below, the apical half broadly winged, 4.5–6 cm. long.

Mexico, Costa Rica, Panama, and Brazil, and probably adjacent areas.

PANAMÁ: hills east of city, near San Juan, sea level, *Powell 295;* McComber Hill, sea level, *Powell 302;* Cerro Campana, 2000 ft., *Allen 4557.* CANAL ZONE: Pedro Miguel, sea level, *Powell 303.*

This species has previously been known in Panama under the name of *Stanhopea Bucephalus*, but unfortunately this must now be listed as a synonym of *S. oculata.* The plants within our area seem for the most part to be confined to the lowlands of both coasts. The fragrant flowers are variable in color, and usually are produced in May and June, lasting only two or three days.

2. STANHOPEA OCULATA (Lodd.) Lindl. Gen. & Spec. Orch. Pl. 158. 1832, as to basinym, but not as to plant described.

Ceratochilus oculatus Lodd. Bot. Cab. 18: *t. 1764.* 1831.
Stanhopea Bucephalus Lindl. Gen. & Sp. Orch. Pl. 157. 1832.

Epiphytic herbs with short, ovoid, subconic pseudobulbs bearing at the apex a single broad, plicate, petiolate, subcoriaceous, elliptic-lanceolate, acute leaf 35–50 cm. long and 8–12 cm. wide. Inflorescences short pendulous racemes typical of the genus. Flowers 2–4, large, creamy white (in our specimens). Sepals membranaceous, the dorsal sepal free, erect, elliptic-lanceolate, concave, acute, 6.5–7.5 cm. long and 1.8–3.5 cm. wide, laterals somewhat connate at the base, reflexed, rather obliquely elliptic-lanceolate, acute, 6–7.5 cm. long and 2–3.5 cm. wide. Petals membranaceous, reflexed, linear-lanceolate, acuminate, 5–6.5 cm. long and 1.1–1.5 cm. wide. Lip fleshy, elongate, 4.5–6.5 cm. long; the hypochile cymbiform, deeply concave, with slender, elongate, falcate thickenings on the lateral

margins, in profile broadly elliptic-lunate, about twice as long as broad (in fresh material), or slightly undulate and about 4 times as long as broad (in dried material), the margins of the canal to the basal concavity closely appressed; the mesochile short, inserted on the apex of the hypochile, with 2 lateral, slender, falcate, incurved, elongate horns; the epichile articulated with the apex of the mesochile, obovate, abruptly apiculate. Column elongate, arcuate, semiterete below, broadly winged above, 5–6.5 cm. long.

Mexico and Panama, and probably adjacent Central and South America.

COCLÉ: region north of El Valle de Antón, 1000 m., *Fairchild s. n.*, *Allen 2931*.

This very striking and handsome species has been found thus far in our area only in the wet highland forests north of El Valle de Antón, in Coclé Province, where the plants seem to be confined to the tops of the tallest trees. The flowers in our specimens were produced in June, being unusually large, and pure creamy white. There seems to be no doubt that the present confusion of names has in considerable part arisen from the unfortunate circumstance that Lindley, while transfering *Ceratochilus oculatus* Lodd. (Bot. Cab. *t. 1764.* 1831) to the genus *Stanhopea*, in his accompanying description (Gen. & Spec. Orch. Pl. 158. 1832) actually gave the basic characters of the then undetected *Stanhopea Wardii*, and also (*ibid.* 157. 1832) re-described the Loddiges plant under the name of *Stanhopea Bucephalus*.

3. STANHOPEA PULLA Rchb. f. in Gard. Chron. n. s. 7:810. 1877.

Erect epiphytic herbs. Pseudobulbs short, stout, ovoid, subconic, somewhat wrinkled, often nearly black, 2.5–3.5 cm. long and 2–2.5 cm. wide, enveloped in 3–4 fibrous, brown, papery bracts, the apex with a single elliptic-lanceolate, long-petiolate, plicate, acute or acuminate leaf 40–60 cm. long and 7–10 cm. wide. Inflorescences very short, pendent, produced from the base of the pseudobulbs, the rachis enveloped in several closely imbricating papery bracts, the apical 2–3 of which are expanded and spathaceous, 3–3.5 cm. long and 1.5–2.0 cm. broad, arching over the flowers. Flowers the smallest known for the genus, usually 2, which face each other on the scape. Sepals membranaceous, pale yellow, concave, the dorsal sepal free, erect, elliptic-lanceolate, acute, 20–30 mm. long and 10–20 mm. wide when spread out; laterals connate at the base, reflexed, ovate to broadly subfalcate, acute, 2.5–3.5 cm. long and 1.5–2.5 cm. broad. Petals membranaceous, reflexed, yellow, ligular, abruptly acute, 2–3 cm. long and .8–1.2 cm. wide. Lip very fleshy, waxy, simple, undivided, tan marked and margined with red-brown, the body composed of the hypochile, which is broadly inflated at the base and adnate to the base of the column, 18–25 mm. long and 18–20 mm. broad, lateral margins more or less erect, the ventral surface of the apex of the hypochile broadly concave; the inner disk with an elongate, more or less prominent, central, reddish-brown keel, terminating at the apex in a short, subcordate acute, fleshy boss confluent with the apex of the hypochile. Column somewhat arcuate, 1.8–2 cm. long, semiterete, without broad lateral wings.

Fig. 170. *Stanhopea Wardii*

Costa Rica and Panama.

CANAL ZONE: vic. Gatún, sea level, *Butcher s. n.* COCLÉ: El Valle de Antón, 800 m., *Cope s. n.* VERAGUAS: Cerro Tuté, region west of Santa Fé, 2500–3000 ft., *Fairchild s. n.*, *Allen 4507, 5200.*

Apparently a frequent species, to be expected in areas of low to moderate elevation of the Atlantic slope and adjacent high-rainfall portions of the Pacific watershed. Thus far, the species seems to be most frequent in the mountains west of Santa Fé, in Veraguas Province. The flowers are quite variable in size and to a lesser degree in structure.

4. STANHOPEA WARDII Lodd. ex Lindl. Sert. Orch. *t. 20.* 1838.

Stanhopea aurea Lodd. ex Lindl. in Bot. Reg. n. s. 4: Misc. 11. 1841.
Stanhopea venusta Lindl. loc. cit. 1841.
Stanhopea amoena Kl. in Allgem. Gartenzeit. 20:273. 1852.

Erect epiphytic herbs, the plants nearly identical with those of *Stanhopea graveolens*. Pseudobulbs short, ovoid, the apex with a single broad plicate, petiolate leaf. Flowers relatively large, on short or somewhat elongate, pendent racemes from the base of the pseudobulbs. Sepals membranaceous, concave, pale yellow dotted brownish purple, the dorsal sepal free, erect, elliptic-lanceolate, acute or apiculate, 4.5–6 cm. long and 1.5–2.5 cm. wide, laterals somewhat connate at the base, reflexed, elliptic-lanceolate, acute, 4.5–6 cm. long and 2–3 cm. wide. Petals pale yellow, dotted brownish purple, reflexed, with undulate margins, lanceolate-acuminate, 4–5 cm. long and .8–1.5 cm. wide. Lip very fleshy, complexly 3-parted, 4.5–5 cm. long; the hypochile inflated, subsaccate, inserted on the base of the column, with 2 large, lateral, purple-brown spots, in profile geniculate or subgeniculate, with (in fresh material) a deeply emarginate, central constriction (in fresh material somewhat longer than broad, in dried material about twice as long as broad), with a more or less pronounced gibbose swelling about the middle of the lower surface; the lateral margins with falcate, acuminate thickenings the bases of which, above the basal concavity, are produced into two short, broad, rather obscure teeth; mesochile short, pale yellow, inserted on the apex of the hypochile, with 2 elongate, acuminate, incurved, falcate horns; epichile pale yellow, articulated to the apex of the mesochile, ovate, acute, concave, with somewhat reflexed margins. Column somewhat arcuate, subterete below, broadly winged above, 4–4.5 cm. long.

Mexico, Guatemala, Costa Rica, Panama, and probably also adjacent areas in Central and South America.

COCLÉ: El Valle Chiquito, 1800 ft., *Allen 5123;* Río Mata Ahogado, 1500 ft., *Allen 5070;* El Valle de Antón, 2000 ft., *Fairchild s. n.* CHIRIQUÍ: without definite locality, 4000 ft., *Powell 103.*

A common, attractive species, closely allied to *Stanhopea oculata*, found in Panama throughout the intermediate highlands of the Pacific slope. The fragrant flowers usually are produced in August and September, lasting about two or three days.

56. GONGORA Ruiz & Pavon

GONGORA Ruiz & Pavon, Fl. Peruv. & Chil. Prodr. 117, *t. 25*. 1794; Benth. & Hook. Gen. Pl. 3:549. 1883; Pfitz. in Engler & Prantl, Pflanzenfam. 2:169. 1888.

Acropera Lindl. Gen. & Sp. Orch. Pl. 172. 1833.

Epiphytic herbs. Pseudobulbs stout, ovoid, ridged, the bases enveloped in 2–3 fibrous, imbricating bracts, the apex with 2–3 broad, plicate, petiolate, elliptic-lanceolate leaves. Inflorescences usually elongate, pendent racemes from the base of the pseudobulbs. Flowers few to many, relatively large, on long pedicels. The genus has been divided by Pfitzer into the two sections ACROPERA and EUGONGORA. In section ACROPERA: pedicels usually strongly arcuate; the lateral sepals about as broad as long, spreading or somewhat reflexed, the apex broadly acute or obtuse and abruptly apiculate; the sepals and petals all more or less connivent at the base; the lip with a narrow, short or elongate, ligular basal claw; the mesochile conspicuously lobed or inflated and saccate, rarely with apical horns or antennae; the epichile elongate, lanceolate-acuminate, sometimes reduced to an obscure apicule, or divided and biligular at the apex; column slender and somewhat arcuate, dilated at the apex, sometimes narrowly winged and obscurely 2-cornute, produced at the base into a foot. In section EUGONGORA: pedicels usually straight or slightly curved; the lateral sepals usually nearly twice as long as broad, strongly reflexed, the apex acuminate, the margins strongly reflexed, the bases inserted on the foot of the column; the dorsal sepal and the petals inserted on the upper column, their bases not connivent with those of the lateral sepals; the lip very fleshy, often laterally compressed, complexly 2-parted, with both a well developed hypochile and epichile; the base of the hypochile with or without short, lateral, rounded, ligular or auriculate callosities, the apical margin usually with 2 slender, erect antennae; the epichile usually with a gibbose or conical, basal projection above the basal constriction; column slender and somewhat arcuate, semiterete below, dilated above, without lateral wings, but with the inserted petals resembling stelidia; the base of the column produced into a foot. In both sections of the genus the anther is terminal, operculate, incumbent, 1-celled or imperfectly 2-celled; pollinia 2, waxy.

A perplexing genus of American epiphytes ranging from southern Mexico to Peru and Brazil. The flowers are of exceedingly complex structure, in many cases almost impossible to describe, yet all too often type descriptions are unaccompanied by figures or if the figures are given they prove to be inadequate in one or several

critical details. Of the many published names, perhaps about a dozen fairly well-marked entities can be segregated, but even these often are subject to a considerable amount of variation. The treatment of variants of this type is a matter of individual opinion, past practice usually having been to regard them as distinct species which appear in the literature as of equal value. The principal objection to such a method is that it does nothing to express the often very apparent relationships of many of these so-called species to each other. Many groups of entities are found to be identical in nearly every major detail, often having, shall we say, a strong "family" resemblance, and differing only in the absence or presence or development of some one or two structural details. It would seem the obvious course to accentuate these similarities, rather than to obscure them. For the purposes of this treatment, it is proposed therefore to treat these relatively less important deviations from established types as varieties. On this basis, two species, and three well-marked varieties thus far have been found in Panama.

a. Bases of all 3 sepals connivent (Section ACROPERA)
  b. Apex of the mesochile with 2 short lateral horns ..... 2. G. ARMENIACA var. BICORNUTA
  bb. Apex of the mesochile without 2 short lateral horns ..... 1. G. ARMENIACA
aa. Base of the dorsal sepal inserted on the upper column, not connivent with the bases of the lateral sepals (Section EUGONGORA).
  b. Hypochile when seen from above relatively narrow, the base with lateral ligular projections ..... 3. G. MACULATA
  bb. Hypochile when seen from above relatively broad, the base auriculate or with short lateral fleshy rounded horns.
    c. Basal callosities of the hypochile auriculate ..... 4. G. MACULATA var. LATIBASIS
    cc. Basal callosities of the hypochile short, fleshy, rounded horns ..... 5. G. MACULATA var. TRICOLOR

1. GONGORA ARMENIACA (Lindl.) Rchb. f. Xenia Orch. 1:52. 1854.

Acropera armeniaca Lindl. & Paxt. in Paxton's Flow. Gard. 1:94. 1850–51.
Acropera cornuta Kl. in Allgem. Gartenzeit. 20:186. 1852.

Erect epiphytic herbs. Pseudobulbs ovoid, ridged, often somewhat laterally compressed, 2–4.5 cm. long and 1.5–2.5 cm. wide, the bases enveloped in 2–3 papery, imbricating bracts, the apex with 2 elliptic-lanceolate, plicate, acuminate leaves 10–22 cm. long and 2–4.5 cm. wide. Inflorescences more or less elongate, pendent racemes from the base of the pseudobulbs. Flowers usually many, somewhat variable in structure, relatively large and conspicuous. Sepals membranaceous, the bases all connivent, yellow, orange, or salmon, sometimes with purple-brown spots, dorsal sepal erect, concave, elliptic-oblong and acute to broadly rectangular and obtuse or shortly apiculate, 12–18 mm. long and 6–12 mm. wide, laterals spreading or reflexed, their bases inserted on the column foot, obliquely ovate, acute or obtuse and shortly apiculate, 15–17 mm. long and 12–14 mm. broad. Petals membranaceous, pale salmon or orange, lanceolate and abruptly acuminate, or subfalcate and acuminate, 4–6 mm. long and 2.5–3 mm. wide, the attenuate apices usually recurved, the bases broadly spreading and connivent with

Fig. 171 *Gongora armeniaca* var. *bicornuta*

those of the sepals. Lip with a short, ligular basal claw, apparently articulated with the column foot, the central portion or mesochile inflated, subcalceiform, waxy yellow, 8–12 mm. long, the apex broadly obtuse, with a short or elongate, erect, linear-lanceolate, acuminate projection 6–10 mm. long. Column erect, semi-terete below, dilated and subclavate above, 9–11 mm. long, the base produced into a foot. Rostellum conspicuously elongate.

Nicaragua, Costa Rica, and Panama.

CHIRIQUÍ: without definite locality, 4500 ft., *Powell 432*.

2. GONGORA ARMENIACA (Lindl.) Rchb. f. var. BICORNUTA C. Schweinf. & P. H. Allen, in Bot. Mus. Leafl. Harv. Univ. 13:139. 1948.

Plants typical of the species. Sepals pale cream-yellow, densely and minutely spotted red. Petals rich dark red. Lip elongate-calceiform, waxy orange, the dorsal surface with a short, erect, acute lobe near the conjunction of the broad posterior margins, the apex with 2 short, lateral, fleshy horns from between which is produced an elongate, acuminate, erect, orange projection with a rich dark red tip. Column erect, subligular below, dilated above, the apex obscurely winged, with two short pointed horns on either side of the conspicuously elongate rostellum.

Panama.

VERAGUAS: Cerro Tuté, region west of Santa Fé, 3000 ft., *Allen 4648*.

A well-marked variety differing from the type in the presence of 2 fleshy horns on the apex of the mesochile, on either side of the slender central acuminate projection, the short pointed horns on either side of the rostellum at the apex of the column, and in the apparently richer coloring of the floral parts.

3. GONGORA MACULATA Lindl. in Bot. Reg. n. s. 6:196, *t. 1616*. 1833.

Gongora nigrita Lindl. loc. cit. Misc. n. s. 2:59. 1839.
Gongora leucochila Lem. in Fl. des Serres 1:207, *t. 37*. 1845.
Gongora odoratissima Lem. loc. cit. 2:229. 1847.
Gongora retrorsa Rchb. f. in Bonplandia 2:19. 1854.
Gongora Boothiana Hort. ex Rchb. f. Xenia Orch. 1:54. 1854.
Gongora Jenischii Hort. loc. cit. 1854.
Gongora quadricornis Hort. loc. cit. 1854.
Gongora Shepherdii Hort. loc. cit. 1854.
Gongora vitellina Hort. loc. cit. 1854.
Gongora superflua Rchb. f. loc. cit. 2:169. 1873.
Gongora truncata var. *alba* Nash, in Addisonia 2: *t. 46*. 1917.
Gongora Powellii Schltr. in Fedde, Rep. Sp. Nov. Beih. 17:62. 1922.
Gongora unicolor Schltr. loc. cit. 19:229. 1923.

Epiphytic herbs. Pseudobulbs erect, clustered, ovoid, strongly ridged and sulcate, 4.5–6.5 cm. long and 2–3.5 cm. wide, the bases enveloped in 2–3 fibrous, imbricating bracts, the apex with 2-3 lanceolate or elliptic-lanceolate, plicate, acute or acuminate leaves 25–40 cm. long and 5–11 cm. broad. Inflorescences

Fig. 172. *Gongora maculata*

elongate, pendulous racemes from the base of the pseudobulbs. Flowers many, grotesque, strongly fragrant, relatively large, on elongate, slender, nearly straight pedicels. Sepals membranaceous, pale yellow, spotted or banded reddish brown (in our specimens), dorsal sepal free, erect, the base inserted about midway on the column, lanceolate, acuminate, the margins often strongly recurved, 1.5–1.8 cm. long and .4–.6 cm. wide, the base not connivent with the bases of the lateral sepals, lateral sepals strongly reflexed, inserted on the column foot, obliquely ovate, acuminate when spread out, the lateral margins strongly recurved, 20–25 mm. long and 9–14 mm. wide. Petals colored similarly to the sepals, resembling stelidia, the bases inserted on the column and connivent with the base of the dorsal sepal, linear-lanceolate, acuminate, the attenuate apices somewhat recurved, 6–8 mm. long and 1–2 mm. broad. Lip fleshy, 1.5–2 cm. long, pale yellow, marked reddish brown (in our specimens), complexly 2-parted, the short, ligular, basal claw apparently articulated with the column foot; the hypochile saccate, of 2 complex, erect, lateral lobes, the upper closely appressed margins of which combine to form a dorsal keel, the hypochile when seen from above with 2 slender, lateral, ligular, somewhat recurved projections from the base, the apex in profile abruptly truncate and deeply concave, with two lateral erect elongate antennae prolonged into short acuminate teeth; the epichile laterally compressed, about as long as the hypochile, subsaccate and gibbose above the basal constriction, the apex in profile cuneate, with an attenuate recurved tip. Column erect, somewhat arcuate, 15–20 mm. long, terete below, somewhat dilated and subclavate above the point of insertion of the dorsal sepal and petals.

Mexico, British Honduras to Brazil and Ecuador.

CANAL ZONE: Mojinga Swamp, near the mouth of the Río Chagres, sea level, *Allen 870*; Ancon, in hospital grounds, sea level, *Pittier 6627, 6630*. PANAMÁ: Matías Hernández, east of Panama City, sea level, *Pittier 6630*; hills east of Panama City, sea level, *Powell 63, 70, 76, 176*. COLÓN: forests along the Río Boquerón, above the Peluca Hydrographic Station, 90 m., *Hunter & Allen 649* (in part). COCLÉ: El Valle de Antón, 500–700 m., *Hunter & Allen 352*; El Valle Chiquito, 600 m., *Dunn s. n.*; region north of El Valle de Antón, 800 m., *Allen 2943*; mountains beyond La Pintada, 400–600 m., *Hunter & Allen 647*. BOCAS DEL TORO: Water Valley, vic. Chiriquí Lagoon, *von Wedel 1472*.

This common and widely distributed species is found in damp shaded locations at low to moderate elevations throughout our range. It seems possible that this may be the species described by Ruiz & Pavon as *Gongora quinquenervis*, but their description is obscure and entirely inadequate, and a photograph of the type shows it to have been based on fruiting material only; hence it has been considered best to adopt the next available name. As would be expected in a species having such a tremendous geographic range, the flowers in other areas are variable in color and to a lesser degree in size. In Panama, the flowering season is from November to May, individual plants usually producing two or more successive inflorescences.

4 GONGORA MACULATA Lindl. var. LATIBASIS C. Schweinf. & Allen, in Bot. Mus. Leafl. Harv. Univ. 13:144. 1948.

Vegetative material not seen. Pseudobulbs described as round and deeply grooved, about 5 cm. wide, the apex with 2 grayish green leaves 30 cm. long and 10 cm. wide. Sepals membranaceous, dark blood-red, the dorsal sepal erect, inserted on the column, elliptic-lanceolate, acute, 2–2.2 cm. long and 1.2–1.4 cm. broad, the lateral sepals inserted on the column foot, strongly reflexed, obliquely ovate, shortly acuminate, the lateral margins strongly recurved, about 3 cm. long and 2 cm. broad when spread out. Petals inserted on the column, their bases connivent with the base of the dorsal sepal, light green spotted red, linear-lanceolate, acuminate, subfalcate, the attenuate apices incurved, 12–14 mm. long and about 2 mm. broad. Lip very fleshy, complexly 2-parted, dark blood-red; the hypochile when seen from above about 2 cm. long and 1.3 cm. broad at the abruptly truncate base, the lateral lobes broadly auriculate; the apex of the hypochile, seen in profile, with 2 erect, slender antennae prolonged below as short, acute teeth; the epichile typical of the species, except for the basal projection, which in this case is prolonged into an almost conical spur.

Panama.

COLÓN: about 2 miles west of Gatún Dam, 600 ft., *Butcher s. n.*

A very striking and well-marked variety, differing from the type in the larger, more richly colored flowers, the broader, auriculate base of the hypochile, and the prolonged subconic projection at the base of the epichile.

5. GONGORA MACULATA Lindl. var. TRICOLOR Lindl. in Bot. Reg. n. s. 10: *t. 69.* 1847.

Gongora fulva Lindl. loc. cit. 2: *t. 51.* 1839.
Gongora bufonia Lindl. loc. cit. 4: *t. 2.* 1841.

Plants identical with those of the type. Sepals rich yellow to orange, usually spotted or blotched dark red or dark purple. Petals greenish yellow, usually spotted or marked dark red. Lip very fleshy, complexly 2-parted, rich yellow or orange, usually marked dark red, or dark purple. The hypochile when seen from above with a relatively broad base, with two short, fleshy, rounded horns on each side, otherwise identical with the type.

Panama and Peru, and probably adjacent territory.

CANAL ZONE: Mojinga Swamp, near the mouth of the Río Chagres, sea level, *Allen 911.* PANAMÁ: foothills east of Panama City, sea level, *Powell 32, 69, 71, 93.* COLÓN: forests along the Río Boquerón, above the Peluca Hydrographic Station, about 90 m., *Hunter & Allen 649* (in part), *650.* COCLÉ: El Valle de Antón, 1800 ft., *Fairchild s. n.*

Distinguished from the type by the somewhat larger, more richly colored flowers, the somewhat broader base of the hypochile, and the rounded, fleshy, basal horns.

57. CORYANTHES Hook.

CORYANTHES Hook. in Bot. Mag. *t. 3102.* 1831; Benth. & Hook. Gen. Pl. 3:549. 1883; Schltr. in Orchis 10:67–82. 1916.

Meliclis Raf. Fl. Tellur. 2:99. 1836.
Panstrepis Raf. loc. cit. 4:41. 1836.
Corynanthes Schlecht. in Bot. Zeit. 6:65. 1848.
Corythantes Lem. in d'Orbigny, Dict. Hist. Nat. 4:259. 1849.

Erect epiphytic herbs. Pseudobulbs slender, subcylindric, tapering, conspicuously ridged, the apex with 2 or rarely 3 lanceolate or elliptic-lanceolate, plicate, strongly veined, subcoriaceous, acute or acuminate leaves. Inflorescences elongate, slender, pendent racemes from the base of the pseudobulbs. Flowers large, fragrant, often brightly colored, usually 2–3, rarely as many as 7, of very complex structure, on slender arching pedicels. The genus has been divided by Schlechter into two sections EUCORYANTHES and LAMELLUNGUIS. In both sections the sepals broad, membranaceous, free, spreading or strongly reflexed, the margins undulate or recurved, the laterals obliquely subfalcate and much larger than the dorsal sepal; the petals inconspicuous, linear-lanceolate, often subfalcately recurved at the apex, with undulate margins. Lip very fleshy, usually complexly 4-parted, the narrow basal claw continuous with the base of the column; the hypochile spreading and concave, or galeate, glabrous or pubescent; the mesochile more or less elongate and canaliculate. In EUCORYANTHES transverse lamellae or excrescences entirely lacking; in LAMELLUNGUIS, these conspicuously present. In both sections epichile inflated, very large and galeate or cup-shaped, in nature usually containing a considerable quantity of clear liquid. Column elongate, terete below, without a foot, the base with 2 short, fleshy, often subfalcate horns or glands from which the liquid is excreted, the apex inflexed-clavate and usually shortly 2-alate on either side of the clinandrium. Anther terminal, operculate, incumbent, 2-celled; pollinia 2, waxy.

About 20 species of American epiphytic plants ranging from Guatemala to Peru and Brazil. They usually occur as a conspicuous element in the unique arboreal myrmecophyllous gardens, in the nests of ants of the genera *Camponotus* and *Azteca*, the association often including a purple- or orange-flowered, erect, tufted *Epidendrum* and several apparently specialized succulent-leaved non-orchidaceous plants, among the most frequent being Peperomias and members of the Gesneriaceae. The flowers are probably the most complex and fascinating of the entire Orchidaceae, every detail of the floral structure having been profoundly modified to attract insects and to assure cross-fertilization.

To accomplish insect attraction, the flowers, although lasting only 3–4 days, are usually brightly colored, large, and strongly fragrant, secreting some substance on the inner margins of the epichile which is extremely attractive to hymenopterous insects. The sepals, although large, soon wither, the direction of the insect's

path being left almost entirely to the intricate contrivances of the marvelous labellum. This organ is unique in the Orchidaceae, the apical lobe or epichile resembling an inverted helmet or waxy cup, on one side prolonged below the apex of the column into a short, usually 3-cornute spout-like channel. The column, in its turn, is sharply reflexed at the apex, which rests precisely over the channel, exposing the anther and stigmatic surface to any insect seeking a way out from the interior of the lip.

It would seem that the broad expanse of the mouth of the epichile would provide ample space for an insect to take flight, with only an occasional individual choosing the lateral exit. If the flowers were of longer duration, this might have been left to pure chance, but since time is also an important factor, this possibility of escape by flight has been ingeniously circumvented by the plant in the following manner. Above the cup, on the base of the column, 2 fleshy glands have been developed. When the flowers are fully open and numbers of bees have been attracted to gnaw at the inner margins of the cup, these glands begin secreting a clear liquid, drop by drop, filling the bottom of the cup to the level of the apical channel. Any bee that loses its footing in the competing swarm on the upper margins is precipitated into this liquid, and once its wings have been wet, it has no other choice than to force its way out through the narrow channel below the stigma and anther. Thus the first bee to make the circuit receives the pollinia firmly cemented to its back, to be inserted on the stigma of this or another flower, on the next turn through. A single species of this most remarkable of all orchid genera has thus far been found in Panama.

1. CORYANTHES MACULATA Hook. in Bot. Mag. *t. 3102.* 1831.

Coryanthes maculata Lindl. in Bot. Reg. 21: *t. 1793.* 1835.
Coryanthes Albertinae Karst. Ausw. Neuer Gew. Venez. 5: *t. 1.* 1848.
Coryanthes splendens Barb. Rodr. Gen. & Sp. Orch. Nov. 1:103. 1877.
Coryanthes Hunteriana Schltr. in Fedde Rep. Sp. Nov. Beih. 17:63. 1922.
Coryanthes Powellii Schltr. loc. cit. 64. 1922.

Erect epiphytic herbs with elongate, subcylindric, tapering, strongly ridged pseudobulbs 6.5–15 cm. long and 2.5–4 cm. wide, bearing at the apex 2 firm, lanceolate, plicate, strongly veined, acute or acuminate leaves 30–60 cm. long and 4–10 cm. wide. Inflorescences slender, elongate, pendent racemes 30–50 cm. long, from the base of the pseudobulbs. Flowers usually 2–3, large and attractive, of variable color, the lip complexly 4-parted. Sepals membranaceous, free, clear yellow with a few purple spots, pale purple, or reddish-brown, dorsal sepal suborbicular-ovate, broadly acute and minutely apiculate, the apical half strongly reflexed, the lateral margins revolute, 2–2.5 cm. long and 3–3.5 cm. broad when spread out, lateral sepals very strongly reflexed, from a broadly lobulate base, obliquely subfalcate, or the pair when spread out obliquely dolabriform, 5–6.5 cm. long and 2.5–4 cm. broad. Petals membranaceous, usually colored similarly to the sepals, ligular-lanceolate, the apices obliquely subacute, the margins undulate,

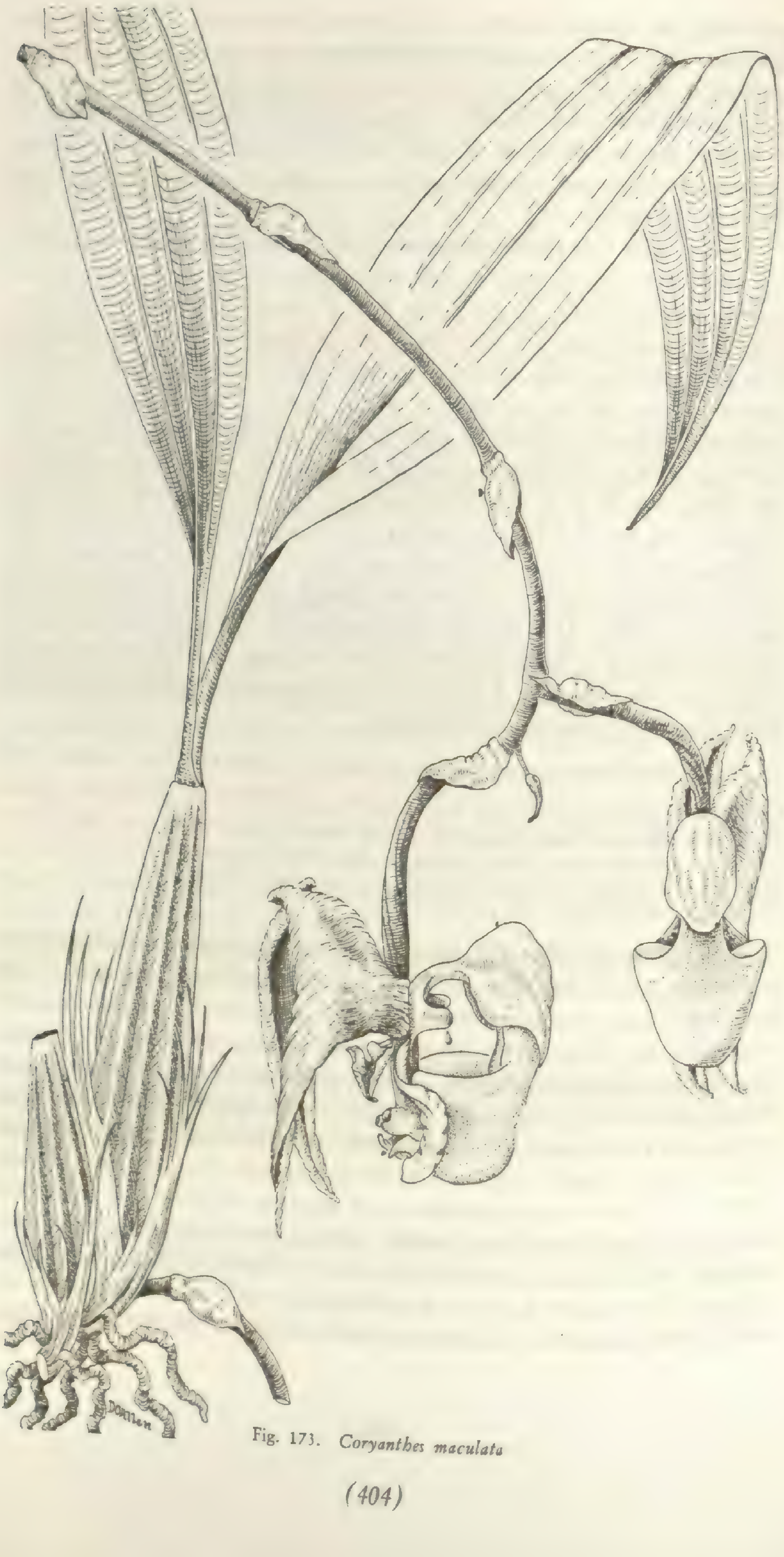


Fig. 173. *Coryanthes maculata*

3–3.5 cm. long and .6–1.0 cm. wide. Lip very fleshy, complexly 4-parted, clear waxy yellow, pale purplish spotted with blood red, or the hypochile yellow, the mesochile and epichile reddish brown on the outer surfaces, the inner epichile white spotted red-brown. Claw of the lip semiterete, continuous with the base of the column; hypochile broadly galeate, glabrous, the apex obtuse or subacute, in profile 2–2.5 cm. long and 2–2.5 cm. broad; mesochile canaliculate, glabrous, the basal half covered by the hypochile, in profile 2.5–3 cm. long and .8–1.5 cm. wide; epichile deeply cucullate or galeate, broadly obtuse, seen in profile 3–3.5 cm. long and 2.5–3.5 cm. broad, in fresh material resembling a waxy cup or bucket, prolonged below the apex of the column into a 3-cornute spout or channel. Column subterete, without a foot, near the base with 2 broad, lateral, subfalcate or obliquely auriculate glands, 8–10 mm. long and 5–10 mm. wide, the apex strongly reflexed and shortly 2-alate on either side of the clinandrium.

Panama, Venezuela, the Guianas, Brazil, and probably other adjacent territory.

CANAL ZONE: Río Indio, near Gatún, sea level, *Butcher s. n.*, *Allen 2054*. PANAMÁ: hills east of Panama City, sea level, *Powell 19, 156, 305*.

In Panama the plants are frequently found in the tops of slender trees, in ants' nests, often associated with *Epidendrum imatophyllum*. They are well protected by the belligerent ants and are painful subjects to collect, and still more painful to transport. Moreover, they seldom thrive in cultivation, possibly from lack of some essential element contributed by the ants in their natural association. It seems possible that this may be only a well-marked variety of *Coryanthes speciosa*.

58. XYLOBIUM Lindl.

XYLOBIUM Lindl. in Bot. Reg. 11: sub *t. 897*. 1825; Benth. & Hook. Gen. Pl. 3:547. 1883.

Onkeripus Raf. Fl. Tellur. 4:42. 1836.
Pentulops Raf. loc. cit. 1836.

Epiphytic herbs with short or elongate, ovoid or semiterete pseudobulbs, the bases enveloped in 2–4 papery, brown, imbricating bracts, the apices with 1–2 lanceolate, plicate, subcoriaceous, strongly veined, acute or acuminate leaves. Inflorescences short or elongate, erect or arching racemes from the base of the pseudobulbs. Flowers few to many, on short pedicels, reminiscent of those of a small-flowered *Maxillaria*. Sepals subequal, membranaceous, spreading, the dorsal sepal free, the laterals broader, adnate to the foot of the column, forming a short mentum, the dorsal surface, particularly near the apex, usually with an erect central keel. Petals membranaceous, subequal to the dorsal sepal. Lip entire or 3-lobed, the lateral lobes or margins erect, the base articulated with the foot of the column; disk smooth, callused or with parallel prominent nerves or lamellae. Column short, erect, somewhat arcuate, semiterete, the apex subclavate or narrowly winged, the base produced into a foot. Anther terminal, operculate, incumbent, 1-celled or imperfectly 2-celled; pollinia 2 or 4, waxy.

About 20 species of American epiphytes, found from southern Mexico to Peru and Brazil, and in the West Indies. The flowers considerably resemble those of some species of *Maxillaria*. However, the genus is amply separated by the racemose flowering habit and the plicate rather than coriaceous leaves. Three species are known from Panama.

a. Lip conspicuously 3-lobed.
b. Lip densely papillose. Pseudobulbs elongate, semi-terete, diphyllous.... 1. X. ELONGATUM
bb. Lip not papillose. Pseudobulbs ovoid, stout, di- or triphyllous..... 2. X. FOVEATUM
aa. Lip entire or obscurely 3-lobed. Pseudobulbs short, subcylindric, monophyllous or very rarely diphyllous ..... 3. X. POWELLII

1. XYLOBIUM ELONGATUM (Lindl.) Hemsl. Biol. Centr.-Amer. Bot. 3:252. 1885.

Maxillaria elongata Lindl. & Paxt. in Paxton's Flow. Gard. 3:69, *fig. 264*. 1852–53.

Epiphytic herbs with erect, elongate, semiterete pseudobulbs 10–27 cm. long and .4–1.2 cm. wide, the bases enveloped in 3–4 brown, papery, imbricating bracts, the apices with 2 lanceolate or elliptic-lanceolate, plicate, strongly veined, acute or acuminate leaves 15–36 cm. long and 2.5–9 cm. wide. Inflorescences erect, slender racemes 10–15 cm. long, produced from the base of the pseudobulbs, the lower portion below the flowers enveloped in several broad, papery, closely imbricating bracts. Flowers few to many, comparatively large, on short pedicels. Sepals membranaceous, white or pale yellow, spreading, subequal, the dorsal sepal free, lanceolate, acute or acuminate, 15–25 mm. long and 4–7 mm. broad, lateral sepals adnate at the base to the column foot, forming a short mentum, somewhat obliquely lanceolate, acuminate, with a strong central keel on the dorsal surface, 15–30 mm. long and 4–8 mm. wide. Petals membranaceous, white or pale yellow, spreading, subequal to the dorsal sepal, lanceolate, acuminate, 15–20 mm. long and 4–7 mm. wide. Lip 3-lobed, articulated at the base with the foot of the column, 14–18 mm. long and 4–8 mm. broad, white or pale yellow, with purple or maroon stripes, lateral lobes conspicuous, erect, about equaling the column, apical lobe densely papillose, the lateral margins strongly inflexed; disk with 5 thickened central nerves or lamellae. Column short, stout, terete, produced at the base into a long broad foot. Anther terminal, operculate, incumbent, 1-celled; pollinia 4, waxy.

Costa Rica and Panama.

COCLÉ: hills north of El Valle de Antón, 1000 m., *Allen 2705, 2745, 3739*. CHIRIQUÍ: near Boquete, 3800–4000 ft., *Powell 167;* Bajo Mono-Robalo trail, western slopes of Cerro Horqueta, 5000–7000 ft., *Allen 4787*.

A frequent plant of the highland forests above about 2500 ft., readily distinguished from the other local species by the extremely elongate, slender, diphyllous pseudobulbs, and the densely papillose lip. Usually to be found in damp situations in heavy shade, often on the lower trunks of large trees. The flowering season is during the fall and winter months, from September to March.

2. XYLOBIUM FOVEATUM (Lindl.) Nicholson, Dict. Gard. 4:225. 1887.

Maxillaria foveata Lindl. in Bot. Reg. n. s. 2: Misc. 2. 1839.
Maxillaria concava Lindl. loc. cit. 7: Misc. 4. 1844.
Maxillaria stachybiorum Rchb. f. in Bot. Zeit. 10:735. 1852.
Xylobium concavum Hemsley, Biol. Centr.-Amer. Bot. 3:252. 1883.
Xylobium stachybiorum Hemsley, loc. cit. 1883.
Xylobium Filomenoi Schltr. in Fedde Rep. Sp. Nov. Beih. 9:100. 1921.

Epiphytic herbs. Pseudobulbs stout, ovoid or subconic, tapering, smooth or somewhat ridged, 4–9 cm. long and 1.5–4 cm. wide, the base enveloped in 2–3 brown, fibrous, imbricating bracts, the apex with 2–3, plicate, lanceolate, strongly veined, acute or acuminate, subcoriaceous leaves 24–40 cm. long and 2.5–7 cm. wide, the blades usually deciduous after the second year, the apex of the old pseudobulbs unarmed. Inflorescences erect racemes 12–30 cm. tall, from the base of the pseudobulbs, the lower rachis below the flowers enveloped in several broad, papery bracts. Flowers usually many, fragrant, on short pedicels. Sepals membranaceous, subequal, spreading, creamy white, the dorsal sepal free, lanceolate-acuminate, 10–14 mm. long and 3–4 mm. wide, laterals adnate to the foot of the column, forming a mentum, subfalcately lanceolate-acuminate, 12–14 mm. long and 3–4 mm. wide, the dorsal surface with a prominent central keel. Petals subequal to the dorsal sepal, membranaceous, creamy white, lanceolate-acuminate, 8–10 mm. long and 2–3 mm. wide. Lip creamy white with reddish veining on the disk, conspicuously 3-lobed, 10–12 mm. long, articulated at the base with the foot of the column, the lateral lobes rounded, erect, about equaling or somewhat exceeding the column, apical lobe obtuse, spreading; disk with 5 thickened nerves or keels. Column very short, semiterete, the apex obtuse; the base produced into a long broad foot. Anther 1-celled; pollinia 4.

Mexico to Peru and British Guiana; Jamaica.

CANAL ZONE: Barro Colorado Island, *Aviles 32.* PANAMÁ: Ceiba Tierra, sea level, *Powell 3069;* Ana Lago, sea level, *Powell 3064;* hills east of Panama City, sea level, *Powell 27;* Chiva-Chiva, sea level, *Powell 3053;* vic. Pacora, sea level, *Powell 3026, Allen 821;* forest along telephone cable, vic. Río Indio Hydrographic Station, Upper Madden region, *Steyermark & Allen 17466;* San José Island, Perlas Archipelago, *Johnston 1017, 1117.*

A very frequent species found throughout the lowlands of our area, flowering during the fall and winter months from November to March.

3. XYLOBIUM POWELLII Schltr. in Fedde, Rep. Sp. Nov. Beih. 17:66. 1922.

Xylobium sublobatum Schltr. loc. cit. 19:51. 1923.

Erect epiphytic herbs with slender subterete (rarely cylindric-tapering) pseudobulbs 4–7 cm. long and .7–1.8 cm. wide, enveloped at the base in 2–3 fibrous, imbricating bracts, the apex with 1 (rarely 2) lanceolate, plicate, strongly veined, long-petioled, acute or shortly acuminate leaves 20–60 cm. long and 2–5.5 cm. wide. Inflorescences erect racemes, 9–15 cm. tall, the bases below the flower-

ing portion enveloped in several papery, imbricating bracts. Flowers few to many, on short pedicels, yellow or tan, sometimes tinged with light green. Sepals membranaceous, subequal, spreading, the dorsal sepal elliptic-lanceolate, acute, 10–12 mm. long and 4–6 mm. wide, laterals adnate to the foot of the column, forming a mentum, from an oblique base, lanceolate, acute, 12–14 mm. long and 4–6 mm. wide, the dorsal surface with a prominent central keel. Petals subequal to the dorsal sepal, linear-lanceolate, acute, 10–12 mm. long and 3–4 mm. broad. Lip entire or obscurely 3-lobed, articulated at the base with the column foot, 10–12 mm. long; the narrow lateral lobes, if present, or the margins erect; the apical lobe somewhat concave, subacute; disk with 3 prominent erect nerves or keels. Column very short, subterete, produced at the base into a foot. Anther 1-celled; pollinia 4.

Costa Rica and Panama.

CHIRIQUÍ: without definite locality, 4000 ft., *Powell 117*; valley of the upper Río Chiriquí Viejo, vic. of Monte Lirio, 1300–1900 m., *Seibert 135, 223*; Finca Lérida to Peña Blanca, 1750–2000 m., *Woodson & Schery 325*; Quebrada Velo, 1800 m., *Woodson & Schery 281*; vic. Bajo Mono and Quebrada Chiquero, 1500 m., *Woodson & Schery 534*; Bajo Chorro, 6000 ft., *Davidson 241*.

A very frequent species of the Chiriqui highlands, flowering in July and August. Although the type specimen of *Xylobium Powellii* was described as having two leaves, nearly all plants seen had a single leaf. Type material has not been available for comparison, but our species seems to agree very well with an earlier monophyllous species from Guatemala, *Xylobium Tuerckheimii* Kränzl., and it seems likely that subsequent investigation may prove them to be identical.

59. BIFRENARIA Lindl.

BIFRENARIA Lindl. Gen. & Spec. Orch. Pl. 152. 1833; Benth. & Hook. Gen. Pl. 3:546. 1883.
Adipe Raf. Fl. Tellur. 2:101. 1836.
Stenocoryne Lindl. in Bot. Reg. n. s. 6: Misc. 53. 1843.
Lindleyella Schltr. Die Orchideen, p. 414. 1914.

Epiphytic herbs. Pseudobulbs short, fleshy, ovoid, subconic or subpyramidal, often abruptly 4-angulate or laterally compressed, the bases enveloped in 2–3 fibrous, imbricating bracts, the apex with 1–2 lanceolate or elliptic-lanceolate, plicate, strongly veined, acute or acuminate leaves. There are two quite distinctive groups of species, one of which has been segregated by Schlechter as a separate genus under the name *Lindleyella*. Schweinfurth (Bot. Mus. Leafl. Harv. Univ. 11:246. 1944) has pointed out that the floral characters proposed by Schlechter for such separation are equally applicable to species of the other group, so that it is impossible to accept *Lindleyella* as a valid generic concept. However, since the groups are sufficiently distinctive to be separated on gross characters alone, the name proposed by Schlechter is retained as a section, simply for purposes of convenience. On this basis, those species superficially resembling *Bifrenaria atropurpurea*, the generic type with 1–3 large flowers on short erect racemes, are considered

as representing the section EUBIFRENARIA, while those resembling *Bifrenaria picta* and *B. aurantiaca*, with many small flowers on elongate arching racemes, are considered as representing the section LINDLEYELLA. In both sections of the genus, the sepals are free, subequal, spreading, the laterals adnate to the column foot, forming a short or elongate spur-like mentum. Petals subequal to the dorsal sepal or smaller. Lip 3-lobed, articulated at the base with the foot of the column, lateral lobes erect, the mid-lobe spreading, entire or bifid; disk fleshy, lamellate, denticulate or hirsute. Column erect, thickened, semiterete, wingless, produced at the base into an elongate foot. Anther terminal, operculate, incumbent, strongly convex, sometimes cristate on the dorsal surface, 1-celled or imperfectly 2-celled; pollinia 2 or 4, waxy.

A variable genus of mostly Brazilian epiphytes, a few species ranging to Peru, the Guianas, Trinidad, Venezuela, and Colombia, with a single species of the section LINDLEYELLA known from eastern Panama.

1. BIFRENARIA PICTA (Schltr.) C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 11:246. 1944.

Lindleyella picta Schltr. in Fedde Rep. Sp. Nov. Beih. 27:173. 1924.

Epiphytic herbs. Pseudobulbs ovoid, laterally compressed, somewhat ridged, 2.5–5 cm. long and 2–2.5 cm. wide, enveloped at the base in 2–3 fibrous imbricating bracts, the apex with a single, long-petiolate, elliptic-lanceolate, plicate, strongly veined, shortly acuminate leaf 38–46 cm. long and 5–6.8 cm. wide. Inflorescences elongate, slender, arching raçemes produced from the base of the pseudobulbs. Flowers many, relatively small, on short pedicels, typical of the section LINDLEYELLA. Sepals subequal, spreading, membranaceous, deep red, or red marked with yellow particularly at the base, dorsal sepal free, elliptic-lanceolate, acute, 10–14 mm. long and 3–5 mm. wide, lateral sepals somewhat oblique, elliptic-lanceolate, acute, adnate to the foot of the column, 10–14 mm. long and 4–8 mm. wide. Petals subequal to the dorsal sepal, yellow, spotted red, elliptic-lanceolate, acute, 10–12 mm. long and 4–5 mm. wide. Lip 3-lobed, 10–12 mm. long, red marked with yellow, the base shortly clawed, lateral lobes erect, subfalcate, obliquely obtuse, longer than broad, the anterior margin undulate and crisped; disk between the lateral lobes with a convex, rather obscurely verrucose callus; mid-lobe subreniform or subquadrate, broadly spreading, contracted at the base into an isthmus with a short, suberect, fleshy, obtuse, linguiform callus, the apex obscurely bilobulate, shallowly emarginate, the lateral lobules undulate and crisped. Column semiterete, somewhat arcuate, 6–8 mm. long, produced at the base into a foot. Anther imperfectly 2-celled; pollinia 2, subglobose.

Panama and Colombia.

DARIÉN: Chepigana District, Cana-Cuasi trail, 800 ft., *Terry & Terry 1616.*

The only record for the genus in North America.

60. LYCASTE Lindl.

Lycaste Lindl. in Bot. Reg. Misc. n. s. 6: Misc. 14. 1843; Benth. & Hook. Gen. Pl. 3:547. 1883.

Deppia Raf. Fl. Tellur. 2:51. 1836.

Erect, epiphytic or sometimes pseudo-terrestrial herbs. Pseudobulbs short, fleshy, ovoid or ellipsoid, tapering, often laterally compressed, smooth or plurisulcate, the bases enveloped in several closely imbricating, papery or coarsely fibrous bracts, the upper 1 or 2 of which are usually foliaceous; the apex with 1 to several, usually broad, plicate leaves which are ultimately deciduous, the apex of the old pseudobulbs with or without 2 sharp marginal spines; roots fibrous, often pubescent or conspicuously lanuginose. Inflorescences 1 to many erect, stout or filiform, single-flowered scapes from the base of the pseudobulbs, enveloped in several closely imbricating or distant, tubular or spathaceous, papery bracts. Flowers small to large, usually more or less nodding. Sepals subequal, membranaceous, spreading, the laterals somewhat broader than the dorsal sepal, sometimes somewhat reflexed, adnate at the base to the foot of the column, forming a short mentum. Petals subequal to the dorsal sepal or shorter. Lip conspicuously or obscurely 3-lobed, the base continuous with, or articulated with, the foot of the column, lateral lobes or margins erect, mid-lobe spreading or reflexed; disk with a thickened callus. Column slender, semiterete, rather arcuate, produced at the base into a foot. Anther terminal, operculate, incumbent, 1-celled; pollinia 4, waxy.

A rather perplexing genus of perhaps 25 species of American epiphytes, ranging from southern Mexico to Peru, Brazil, and the West Indies. Although many of the species have been put at one time or another into the allied genus *Maxillaria*, they are readily separable by the plicate, rather than conduplicate leaves. Five species are known to occur in Panama.

a. Apex of the old pseudobulbs armed with 2 conspicuous sharp spines. Flowers produced after the leaves have fallen, or concurrently with the flush of new growth. Pseudobulbs at flowering time without mature foliage.
  b. Lip when spread out about as long as broad; apical lobe without a basal constriction.
    c. Lip more than 1.5 cm. long ..... 1. L. BREVISPATHA
    cc. Lip less than 1.5 cm. long ..... 2. L. CAMPBELLII
  bb. Lip when spread out about twice as long as broad; apical lobe with a basal constriction ..... 5. L. TRICOLOR
aa. Apex of the old pseudobulbs not armed with 2 conspicuous sharp spines. Flowers produced at the end of the current season's growth, after the pseudobulbs have matured, but before the leaves have fallen.
  b. Lip conspicuously 3-lobed, more than twice as long as broad when spread out; apical lobe ovate or subquadrate ..... 3. L. MACROPHYLLA
  bb. Lip obscurely 3-lobed, less than twice as long as broad when spread out; apical lobe broadly obtuse, separated from the laterals by plicate folds ..... 4. L. POWELLII

1. LYCASTE BREVISPATHA Kl. ex Lindl. in Paxton's Flow. Gard. 3:44. 1852–53.

Lycaste candida Lindl. ex Rchb. f. in Walp. Ann. 6:604. 1863.

Epiphytic (rarely pseudo-terrestrial) herbs. Pseudobulbs fleshy, usually elliptic-ovoid, rarely suborbicular, laterally compressed, 4.5–6.5 cm. long and 2–3.5 cm. wide, enveloped at the base in several coarsely fibrous bracts, the apex with 2–4 elliptic-lanceolate, plicate, acute or shortly acuminate leaves which are ultimately deciduous, 15–20 cm. long and 3–5 cm. wide, the apex of the old pseudobulbs armed with 2 conspicuous sharp spines; roots usually conspicuously lanuginose. Inflorescences 1 to many slender, erect scapes 5–7 cm. tall, usually produced concurrently with the flush of new growth from the base of the old leafless pseudobulb, the filiform rachis provided with several distant tubular sheathing bracts, the apical bract usually about half the length of the ovary. Flowers more or less pseudo-campanulate, solitary, somewhat nodding. Sepals subequal, membranaceous, usually pale green to olive-green, rarely rose, the dorsal sepal free, erect, elliptic-lanceolate, acute, the apex strongly recurved, 2.5–2.8 cm. long and 10–15 mm. wide, laterals adnate to the foot of the column, forming a short mentum, from the oblique base elliptic-lanceolate, acute, the apices strongly recurved, 2.5–3 cm. long and 1.0–1.5 cm. wide. Petals subequal to the sepals, white marked rose, or rarely pure white, elliptic-oblanceolate, acute, the apices recurved, 2.4–2.6 cm. long and 1.0–1.5 cm. wide. Lip 3-lobed, articulated at the base with the foot of the column, white with rose markings, or rarely white, nearly as broad as long when spread out, 2.2–2.5 cm. long and 1.8–2.2 cm. wide, lateral lobes erect, rather obscurely emarginate at the subacute apices, mid-lobe broadly obtuse, the apex somewhat reflexed; disk with an elongate, acute, 2-costate linguiform callus. Column semiterete, rather arcuate, 8–9 mm. long, the under-surface conspicuously pubescent, the base produced into a foot.

Costa Rica and Panama.

CHIRIQUÍ: without definite locality, shady places, 4000–4500 ft., *Powell 140;* vic. Finca Lérida, upper forested margins of the Quebrada Velo, 5000 ft., *Allen 4749.*

A fairly frequent species of the Chiriquí highlands, usually being found in shaded places between 4000 and 5000 ft. elevation. The flowers are variable in color, usually being produced from February to about April.

2. LYCASTE CAMPBELLII C. Schweinf. in Johnston, Sargentia 8:103, *fig.* 1949. ined.

Epiphytic herbs with ovoid-ellipsoid, somewhat laterally compressed pseudobulbs 3.5–5 cm. long and 1.5–2.5 cm. wide, enveloped at the base in several coarsely fibrous, imbricating sheaths; apex of the pseudobulbs (during the growing season) with 1–3 plicate, elliptic-lanceolate leaves which are ultimately deciduous, the old pseudobulbs armed at the apex with 2 sharp spines; roots fibrous, lanuginose. Inflorescences 1 to several erect, filiform scapes less than 8 cm. tall, produced from the base of the current pseudobulb after the leaves have fallen. Flowers pseudo-campanulate, more or less nodding, the smallest of the genus in Panama. Sepals

subequal, membranaceous, green, the dorsal sepal ovate-elliptic, acute, about 1.8 cm. long and 1 cm. wide when spread out, laterals adnate to the foot of the column, forming a short conical mentum, from the oblique base oblong-ovate, acute, 1.8 cm. long and about 1 cm. wide. Petals elliptic-ovate, obtuse, abruptly apiculate, yellowish green, about 1.5 cm. long and 1 cm. wide. Lip 3-lobed, contracted at the base and articulated with the foot of the column, yellow, about 1.6 cm. long and .9–1.0 cm. wide when spread out, lateral lobes erect and somewhat incurved, the apices rather obliquely acute, mid-lobe ovate, subacute, with a recurved apicule; disk between the lateral lobes with a concave oblong-obtuse callus. Column short, stout, semiterete, somewhat arcuate, about 6–8 mm. long; obscurely puberulent on the under-surface, produced at the base into a foot.

Panama.

PANAMÁ: San José Island, Perlas Archipelago, high on trees in stream-side forest in area 11-B, *Johnston 1371*, *Campbell 12*.

Known only from the type collection. Although vegetatively reminiscent of *Lycaste candida* or *L. tricolor*, it may readily be distinguished by the much smaller, differently colored flowers. The season of flowering is given by Dr. Johnston as February.

3. LYCASTE MACROPHYLLA Lindl. in Bot. Reg. n. s. 6: Misc. 14. 1843.

Maxillaria macrophylla Poepp. & Endl. Nov. Gen. & Sp. 1:37, *t. 64*. 1836.
Lycaste plana Lindl. in Bot. Reg. n. s. 5: Misc. 85. 1842.
Lycaste Dowiana Endres & Rchb. f. in Gard. Chron. n. s. 2:194. 1874.
Lycaste Filomenoi Schltr. in Fedde, Rep. Sp. Nov. Beih. 9:100. 1921.

Epiphytic herbs with stout, ovoid, somewhat laterally compressed, often rather angulate or plurisulcate pseudobulbs 4–10 cm. long and 3–6 cm. wide, the bases enveloped in 3–4 closely imbricating, papery bracts, the upper 2 of which are foliaceous, the largest blade about 40 cm. long and 10–12 cm. broad; the apex of the pseudobulbs with 2–3 broad, plicate, oblanceolate, acute or acuminate leaves 40–75 cm. long and 10–12 cm. broad, which are ultimately deciduous; the apices of the old pseudobulbs not armed with sharp spines. Inflorescences few to many erect, single-flowered scapes 8–18 cm. tall, from the base of the mature pseudobulbs, the rachis enveloped in several broad, papery, spathaceous bracts, the uppermost of which is usually broadly cucullate, acute, about equaling or somewhat exceeding the ovary. Flowers large and conspicuous, fragrant, more or less nodding. Sepals subequal, broadly spreading, olive-green, sometimes shaded on the margins with reddish-brown, the dorsal sepal free, erect, lanceolate to elliptic-lanceolate, acute, 4.5–6 cm. long and 1.5–2.5 cm. wide, laterals adnate to the foot of the column, forming a short mentum, from the oblique base lanceolate to elliptic-lanceolate, acute, 4.5–6 cm. long and 2–3 cm. wide. Petals subequal to the sepals, not spreading, more or less parallel with the column, white, often spotted rose-pink, linear-lanceolate to elliptic-oblanceolate, acute, the apices recurved, 4–5 cm. long and 1.8–2.2 cm. broad. Lip 3-lobed, 3–4.5 cm. long and 1.4–1.6 cm. wide when spread out, usually not equaling the petals, narrowed at the base and

articulated with the foot of the column, white, usually with the margins of the apex spotted or blotched rose-red, lateral lobes erect, the apices rather irregularly oblique, mid-lobe spreading, ovate to subquadrate, acute or obtuse, the margins slightly ciliate and incurved; disk with a fleshy, lanceolate, acute, concave callus. Column slender, semiterete, somewhat arcuate, white, 18–23 mm. long.

Costa Rica, Panama, Colombia, Venezuela, Peru, and Bolivia.

COCLÉ: region north of El Valle de Antón, 3000 ft., *Allen 2665, 5067, 5130;* western slope and summit of Cerro Valle Chiquito, 700–800 m., *Seibert 644.* VERAGUAS: forested slopes of Cerro Tuté, west of Santa Fé, 2500–3000 ft., *Allen & Fairchild 4400.* CHIRIQUÍ: without definite locality, 5000 ft., *Powell 246.*

A frequent, rather variable species of the wet highland forests of Coclé, Veraguas, and Chiriquí provinces. The Coclé specimens are rather consistently smaller than those from Veraguas and Chiriquí, particularly in the vegetative parts, but otherwise appear to be very nearly identical. The Coclé form is usually considered as representing *Lycaste Dowiana,* but the supposed differences (shorter floral bract and narrower lip) have been found on careful examination to be inconstant characters, scarcely any two specimens being exactly alike, and, in any event, hardly differences warranting specific segregation. From the evidence now available, the Coclé plants appear to be at most a local form of the widespread and variable *Lycaste macrophylla.* The flowering season is from March to about July.

4. LYCASTE POWELLII Schltr. in Fedde Rep. Sp. Nov. Beih. 17:65. 1922.

Epiphytic, or often pseudo-terrestrial herbs with elliptic-ovoid, laterally compressed, smooth, or somewhat ridged pseudobulbs 3–6 cm. long and 2–3 cm. wide, the bases enveloped in 3–4 papery, closely imbricating bracts the upper 2 of which are usually foliaceous; the apices of the pseudobulbs with 2–3 plicate, lanceolate or elliptic-lanceolate, acute or acuminate, ultimately deciduous leaves 20–35 cm. long and 4–7 cm. broad; the apices of the old pseudobulbs unarmed. Inflorescences 1 to about 4, slender, erect, 1-flowered scapes 5–14 cm. tall, produced from the bases of the mature pseudobulbs before the leaves have fallen, the rachis provided with several distant, papery, tubular, acuminate bracts the uppermost of which is spathaceous and conspicuously exceeds the ovary. Flowers relatively large, very fragrant. Sepals widely spreading, pale translucent green, heavily blotched with chestnut-brown, or wine-red with yellow margins, dorsal sepal free, linear-lanceolate, acute, 3–4 cm. long and .8–1.4 cm. wide, the apex lightly recurved, laterals adnate to the foot of the column, forming a short mentum, from the oblique base, linear-lanceolate, acute, 3–4.2 cm. long and .6–1.4 cm. wide. Petals subequal to the sepals, cream-yellow to nearly white, spotted rose-pink or wine-red, elliptic-lanceolate, obtuse or subacute, 2.5–3.5 cm. long and 1.2–1.8 cm. wide, more or less parallel with the column, the apices strongly reflexed. Lip elliptic-obovate, obtuse or subacute when spread out, 2.6–2.8 cm. long and 1.4–1.7 cm. wide, obscurely 3-lobed, the lateral lobes or margins erect, the mid-lobe short, spreading, obtuse or subacute, separated from the laterals by plicate folds; disk with a short,

fleshy, ligular, obtuse, concave callus. Column semiterete, 1.8–2 cm. long, slightly arcuate, minutely papillose.

Panama.

PANAMÁ: hills east of Panama City, *Powell 15;* Cerro Campana, 2500 ft., *Fairchild s. n.* COCLÉ: vic. El Valle de Antón, floor and forested ravines in dry hills to the south, 600–800 m., *Allen 761, 2666;* floor of El Valle de Antón, 600 m., *Fairchild s. n.*

A frequent and attractive species of the wooded ravines of the intermediate highlands of Cerro Campana and El Valle de Antón, where they are often found growing on rocks or on low, gnarled trees of the genus *Coccoloba*. The flowering season is usually from July to September.

Fig. 174. *Lycaste tricolor*

5. LYCASTE TRICOLOR (Kl.) Rchb. f. in Walp. Ann. 6:603. 1863.

Maxillaria tricolor Kl. in Allgem. Gartenzeit. 20:186. 1852.
Lycaste Bradeorum Schltr. in Fedde Rep. Sp. Nov. Beih. 19:138. 1923.

Epiphytic herbs with elliptic-ovoid, tapering, laterally compressed, smooth or ridged pseudobulbs 6–9 cm. tall and 2.5–3 cm. wide, the bases enveloped in several coarsely fibrous bracts, the apex (during the growing season) with 3–4 elliptic-lanceolate, plicate, acute or acuminate, deciduous leaves; the apex of the old pseudobulbs armed with 2 short, sharp spines; roots fibrous, lanuginose. Inflorescences 1 to several erect, single-flowered scapes 9–12 cm. tall, from the base of the pseudobulbs, produced after the leaves have fallen or concurrently with the flush of new growth. Flowers pseudo-campanulate, relatively large. Sepals spreading, subequal, the apices strongly recurved, pale green, often spotted with pink, the dorsal sepal free, elliptic-lanceolate, acute, often minutely apiculate, 2.8–3.2 cm. long and 1.2–1.5 cm. wide, lateral sepals adnate at the base to the foot of the column, forming a short mentum, from the oblique base lanceolate, acute, often minutely apiculate, 2.8–3.2 cm. long and 1.0–1.4 cm. wide. Petals subequal to the sepals, spreading, the apices strongly recurved, white, often spotted pink, elliptic-oblanceolate, acute, 2.4–2.6 cm. long and 1.4–1.6 cm. wide. Lip conspicuously 3-lobed, about twice as long as broad when spread out, narrowed at the base and articulated with the foot of the column, white, usually spotted pink, 2.8–3 cm. long and 1.4–1.6 cm. wide when spread out, lateral lobes erect, the anterior margins obscurely emarginate at the obliquely acute apices, mid-lobe subquadrate or ovate, obtuse, with a basal constriction, the apex strongly reflexed; disk with an elongate, acute, concave callus. Column semiterete, somewhat arcuate, 12–14 mm. long, produced at the base into a foot.

Guatemala, Costa Rica, and Panama, and probably adjacent territory.

COCLÉ: Río Mata Ahogado, 1200 ft., *Fairchild s. n.*; Río Mata Ahogado, volcanic badlands southeast of El Valle de Antón, 1500 ft., *Allen 4526*. VERAGUAS: Río Santa María, vic. Santa Fé, 1000 ft., *Allen 4567*.

A frequent and attractive species often found on low-spreading trees overhanging streams in the volcanic badlands of Coclé and Veraguas provinces, usually at about 1000–1500 ft. elevation. It seems possible that subsequent investigation may prove this to be simply a well-marked variety of *Lycaste brevispatha*. The flowering season is in May and June.

60-A. KOELLENSTEINIA Rchb. f.

KOELLENSTEINIA Rchb. f. in Bonplandia 2:17. 1854; Walp. Ann. 6:551. 1863; Schltr. in Orchis 12:24. 1918.

Terrestrial or epiphytic herbs, with or without minute subterete or 4-angulate pseudobulbs. Pseudobulbs when present completely enveloped by the imbricating bases of the foliaceous bracts, the apex with 1 or 2 long-petiolate, slender, plicate

leaves; in plants without pseudobulbs, the several slender, plicate leaves resembling those of a *Bletia*, more or less contracted at the base into a short, sheathing petiole, the basal portions of which are enveloped in several imbricating bracts. Inflorescences lateral, erect, slender racemes, usually more or less equaling the leaves, produced from the base of the current season's growth. Flowers few to many, of moderate size, on short pedicels. Sepals subequal, free, more or less spreading, the laterals usually somewhat broader. Petals subequal to the dorsal sepal or a little less. Lip 3-lobed, contracted at the base into a short claw which is adnate to, or apparently articulated with, the foot of the column, the lateral lobes erect or somewhat spreading, the mid-lobe spreading, rounded or subquadrate, or subreniform, entire, or broadly 2-lobed; disk between the lateral lobes with a thickened callus. Column short, semi-terete, somewhat arcuate, the apical margins projecting and forming a short hood over the clinandrium, the base produced into a short, broad foot. Anther terminal, operculate, incumbent, 1-celled; pollinia 2, waxy.

A South American and West Indian genus previously unrecorded from Panama.

1. KOELLENSTEINIA KELLNERIANA Rchb. f. in Bonplandia 2:17. 1854.

Warrea graveolens Hort. ex Rchb. f. Xenia Orch. 1:65. 1854.

Erect terrestrial herbs, with small, subterete or tetragonous, tapering pseudobulbs 2–3 cm. long and 4–6 mm. wide. Leaves 1 or 2, linear-lanceolate, plicate, acute or acuminate, the bases contracted into a long petiole, 45–70 cm. long and 10–15 mm. wide. Inflorescences erect, 40–60 cm. tall, produced from the base of the current flush of new growth, the peduncle provided with several distant, papery, tubular, acute or acuminate bracts. Flowers of moderate size, few to many, reminiscent of those of a small *Cyrtopodium* or *Warrea*. Sepals rather fleshy, free, subequal, green, the dorsal sepal incurved, rather concave, elliptic-lanceolate, acute, 10–12 mm. long and 4–5 mm. wide, laterals somewhat spreading, rather obliquely elliptic-lanceolate, acute, 10–12 mm. long and 5–6 mm. wide. Petals subequal to the dorsal sepal, submembranaceous, pale green, elliptic-lanceolate, acute, 9–10 mm. long and 3.5–4 mm. wide. Lip rather fleshy, 3-lobed, white transversely barred lavender or purple, 6–8 mm. long and 8–10 mm. wide when spread out, the base abruptly contracted into a short claw which apparently is articulated with the foot of the column, lateral lobes obliquely rhombic-triangular, obtuse, erect, the mid-lobe broadly spreading, somewhat concave, more or less transversely oblong-reniform, the apex sometimes shallowly emarginate; disk with a low, fleshy, tuberculate callus. Column short, stout, semi-terete, rather arcuate, 3–4 mm. long, the margins of the apex slightly projecting and forming a short hood over the clinandrium.

Panama, Colombia, Venezuela, British Guiana, and Brazil.

PANAMÁ: grassy ridges, vic. Cerro Jefe, hills east of Panama City, 2500 ft., *Rolland Jones s. n.* (under *Allen 3791*). COCLÉ: Loma del Tigre, hills north of El Valle de Antón, 3000 ft., *Allen 3562*.

61. ZYGOPETALUM Hook.

ZYGOPETALUM Hook. in Bot. Mag. *t. 2748.* 1827; Benth. & Hook. Gen. Pl. 3:542. 1883.

Zygopetalon Rchb. Consp. 69. 1828.
Galeottia A. Rich. in Ann. Sci. Nat. Bot. III, 3:25. 1845.

Epiphytic or terrestrial herbs. Pseudobulbs ovoid or subcylindric, tapering, the bases enveloped in several short or elongate, non-foliaceous or foliaceous bracts, the apex with 1 or 2 lanceolate or elliptic-lanceolate, plicate leaves. Inflorescences short or elongate, erect, racemose, produced from the base of the current growth; scape bracts small or large. Flowers few to many, small, or large and conspicuous. Sepals subequal, spreading, free or slightly connate at the base, the laterals adnate to the foot of the column, forming a short, broad mentum. Petals subequal to the sepals. Lip conspicuously or obscurely 3-lobed, the base affixed to, or articulated with, the column foot, the lateral lobes spreading or erect, the mid-lobe broadly spreading, or the apex strongly recurved; the disk with a prominent, fleshy, often lunate, tuberculate or cristate callus. Column rather short, stout, semi-terete, somewhat arcuate, the apex with or without conspicuous lateral wings, the base produced into a short foot. Anther terminal, operculate, incumbent, 2-celled; pollinia 4, waxy.

A polymorphic genus of American epiphytic and terrestrial herbs, ranging from southern Mexico to Peru and Brazil.

a. Plants epiphytic. Flowers large and conspicuous; lip 3-lobed, the margins fimbriate..... 1. Z. GRANDIFLORUM
aa. Plants terrestrial. Flowers small; lip subpandurate, the margins entire.... 2. Z. PARVIFLORUM

1. ZYGOPETALUM GRANDIFLORUM (A. Rich.) Benth. & Hook. ex Hemsl. Biol. Centr.-Amer. Bot. 3:251. 1883.

Galeottia grandiflora A. Rich. in Ann. Sci. Nat. Bot. III, 3:25. 1845.
Batemannia grandiflora Rchb. f. in Bonplandia 4:323. 1856.

Epiphytic herbs, with ovoid, somewhat furrowed pseudobulbs 3.5–6 cm. long and 2–3 cm. wide, enveloped at the base in 3–4 papery, imbricating bracts; the apex of the pseudobulbs with 2 elliptic-lanceolate, plicate, acute leaves 25–50 cm. long and 4–6.5 cm. wide. Inflorescences 15–18 cm. tall, produced from the base of the current flush of new growth. Flowers 1 to about 5, large and conspicuous, the pedicels subtended by broad, spathaceous, papery bracts. Sepals subequal, spreading, the apices recurved, green striped reddish brown, dorsal sepal free, lanceolate-acuminate, 3.0–4.5 cm. long and 1.0–1.5 cm. wide, laterals connate at the base and adnate to the foot of the column, forming a gibbose mentum, rather obliquely lanceolate, acuminate, 3.0–4.5 cm. long and 1.2–1.8 cm. wide. Petals subequal to the sepals, obliquely falcate, acuminate, spreading, the broad bases adnate to the sides of the column foot, the apices recurved, green striped reddish-brown, 3.0–4.0 cm. long and 1.2–1.8 cm. wide. Lip conspicuously 3-lobed, ab-

Fig. 175. *Zygopetalum grandiflorum*

ruptly contracted at the base, with a short claw which is articulated with the column foot, white with dull red or purple longitudinal markings, lateral lobes erect, rather obliquely acute, with fimbriate margins, mid-lobe obovate, acuminate, somewhat concave, the attenuate apex strongly recurved, the lateral margins fimbriate; disk between the lateral lobes with a broad, erect, lunate, prominently ridged and furrowed, multi-denticulate callus. Column broad, stout, arcuate, 1.5–2 cm. long, the apex with 2 short, denticulate processes on either side of which are 2 subfalcate, obliquely obtuse wings with ciliate apical margins; the base of the column produced into a short, broad foot.

Mexico, Guatemala, Costa Rica, and Panama.

CHIRIQUÍ: vic. Cerro Punta, headwaters of the Río Chiriquí Viejo, 2000 m., *Allen 3604.*

2. ZYGOPETALUM PARVIFLORUM L. Wms. apud Woodson & Schery, in Ann. Mo. Bot. Gard. 28:424, *t. 25.* 1941.

Erect, robust, terrestrial herbs, with slender, subcylindric, tapering pseudobulbs 6–9 cm. tall and about 1.5 cm. wide; leaves and blades of the foliaceous bracts linear-lanceolate to elliptic-lanceolate, plicate, acute or acuminate, the bracts contracted at the base into a short sheathing petiole, the imbricating bases completely enveloping the small pseudobulb. Leaves 30–70 cm. long and 2.5–7 cm. wide. Inflorescences 60–80 cm. tall, produced from the basal portion of the current flush of new growth. Flowers several or many, among the smallest in the genus, described as "purple, the lip violet; column white." Sepals subequal, rather fleshy, spreading, oblong-ovate, acute, 7–10 mm. long and 3.5–5 mm. wide. Petals subquadrate, obtuse, 7–8 mm. long and 4–4.5 mm. wide. Lip obscurely 3-lobed, subquadrate, panduriform, 7–8 mm. long and 5–6 mm. wide, abruptly contracted at the base, with a short claw which is articulated with the column foot, lateral margins rounded and spreading, mid-lobe rectangular, abruptly truncate, spreading; the disk with a broad, transverse, subreniform, fleshy callus. Column short, semi-terete, somewhat dilated at the apex, 4–5 mm. long. Anther and pollinia typical of the genus.

Panama.

CHIRIQUÍ: vic. Bajo Chorro, headwaters of the Río Caldera, 1900 m., *Woodson & Schery 605;* vic. Bajo Chorro, in rain forest, 6000 ft., *Davidson 345.*

62. CHONDRORHYNCHA Lindl.

CHONDRORHYNCHA Lindl. in Orch. Linden. 12. 1846; Rchb. f. in Walp. Ann. 6:663. 1863; Benth. & Hook. Gen. Pl. 3:548. 1883.

Kefersteinia Rchb. f. in Bot. Zeit. 10:633. 1852.
Warczewiczella Rchb. f. loc. cit. 635. 1852.
Warscewiczella Rchb. f. Xenia Orch. 1:61. 1858.
Warszewiczella Benth. & Hook. Gen. Pl. 3:543. 1883.

Tufted epiphytic herbs without pseudobulbs. Leaves distichously arranged in the form of an open fan, erect or arching, plicate, lanceolate, acute or acuminate, contracted below into conduplicate petioles. Inflorescences slender, erect, arching or semi-pendulous, 1-flowered, scapose, less than half the length of the leaves, produced from the axils of the lower leaves or bracts. Flowers small to large and conspicuous. Sepals subequal, free, spreading, membranaceous, the dorsal sepal erect, the laterals often retrorse, obliquely inserted on the short column foot. Petals usually spreading, subequal to the dorsal sepal or broader. Lip usually cucullate, obovate, suborbicular or subquadrate, sometimes obscurely or conspicuously 3-lobed, the lateral lobes or margins erect, or the lip explanate and divided into a narrow basal and a broad apical part, contracted at the base and adnate to, or articulated with, the very short column foot, sometimes forming a very short mentum; disk with a broad or narrow, more or less fleshy callus, the apex free and usually denticulate, or rarely with the basal callus conspicuously pedicellate, the apex scutellate. Column semi-terete, slender or broadly clavate above, sometimes narrowly winged, the ventral surface with or without a keel, rarely with a broad, 2-alate plate below the stigma, the base of the column produced into a very short foot. Anther terminal, operculate, incumbent, 1-celled or imperfectly 2-celled; pollinia 4, waxy.

a. Lip explanate, subpandurate, never concave or cucullate, divided into narrower basal and broader apical parts ..... 1. C. AROMATICA

aa. Lip concave or cucullate, entire or 3-lobed, suborbicular or obovate when spread out.

b. Lip entire when spread out. (See also alternate bb)

c. Flowers small; lip 1.2 cm. long or less.

d. Basal callus conspicuously pedicellate, the apex 2-scutellate..... 3. C. COSTARICENSIS

dd. Basal callus sessile, the free apex bifid ..... 5. C. LACTEA

cc. Flowers relatively large and conspicuous; lip 2.5 cm. long or more.

d. Lateral margins of the basal callus erect, thickened, and confluent with the erect incurving lateral margins of the lip. Lowland species ..... 6. C. MARGINATA

dd. Lateral margins of the basal callus not erect, not thickened, nor confluent with the incurving lateral margins of the lip. Highland species.

e. Basal callus linear, the free apex bifid ..... 2. C. CALOGLOSSA

ee. Basal callus radiate, digitate, the free projecting apex with 5–7 elongate teeth of unequal length ..... 4. C. DISCOLOR

bb. Lip obscurely or conspicuously 3-lobed when spread out, 2.5 cm. long or more.

c. Lateral margins of the basal callus erect, thickened, and confluent with the erect incurving lateral margins of the lip. Lowland species. ..... 6. C. MARGINATA

cc. Lateral margins of the basal callus not erect, not thickened, nor confluent with the erect incurving lateral margins of the lip. Highland species.

d. Basal callus linear, with a free bifid apex ..... 2. C. CALOGLOSSA

dd. Basal callus radiate, digitate, the free projecting apex with 5–7 elongate teeth of unequal length ..... 4. C. DISCOLOR

1. CHONDRORHYNCHA **aromatica** (Rchb. f.) P. H. Allen, comb. nov.

Zygopetalum aromaticum Rchb. f. in Bot. Zeit. 10:668. 1852.
Warscewiczella aromatica Rchb. f. in Walp. Ann. 6:654. 1863.
Zygopetalum Wendlandi Rchb. f. Beitr. Orch. Centr.-Amer. 74. 1866.
Bollea Wendlandiana Hort. ex Gard. & For. 1:315. 1888.
Warscewiczella Wendlandi (Rchb. f.) Schltr. in Beih. Bot. Centralbl. 36^2:494. 1918.

Erect tufted epiphytic herbs without pseudobulbs. Leaves linear-ligular to elliptic-lanceolate, plicate, acute or shortly acuminate, 15–30 cm. long and 1.5–2.5 cm. wide. Inflorescences erect or arching 1-flowered scapes 7–9 cm. long, from the axils of the non-foliaceous basal bracts. Flowers relatively large and conspicuous. Sepals subequal, free, spreading, pale green or yellowish green, the dorsal sepal elliptic-lanceolate, acuminate, 2.5–3 cm. long and .6–.8 cm. wide, the laterals lanceolate, acuminate, 2.8–3.2 cm. long and .9–1.0 cm. wide. Petals subequal to the dorsal sepal, spreading, pale or yellowish green, lanceolate, acuminate, 2.5–3 cm. long and .5–.6 cm. wide. Lip explanate, subpandurate, the base obscurely lobed, abruptly contracted into a short claw, lavender or violet, usually with white margins, 2.2–2.5 cm. long and 1.5–1.7 cm. wide, divided into a more or less rectangular basal half and a broader undulate and reflexed apex; disk with a lunate to radiate or rhombic, spreading, plurisulcate, violet-blue callus. Column short, erect, white, semi-terete below, the apex clavate and narrowly winged. Anther terminal, operculate, incumbent, 1-celled.

Costa Rica and Panama.

CHIRIQUÍ: without definite locality, 4000–5000 ft., *Powell 248*.

The flowers of our specimens seem to be somewhat smaller than typical Costa Rican material, but otherwise are identical.

2. CHONDRORHYNCHA **caloglossa** (Schltr.) P. H. Allen, comb. nov.

Warscewiczella caloglossa Schltr. in Fedde Rep. Sp. Nov. 12:216. 1913.
Chondrorhyncha estrellensis Ames, Sched. Orch. 4:54. 1923.

Erect tufted epiphytic herbs without pseudobulbs, 23–28 cm. tall, the plants typical of the genus. Inflorescences erect or arching, 1-flowered scapes 10–15 cm. long, from the axils of the lower foliaceous bracts. Flowers relatively large and conspicuous. Sepals subequal, membranaceous, free, white or pale yellow, the dorsal sepal erect, lanceolate, acute or acuminate, 2.8–3.2 cm. long and .6–.7 cm. wide, laterals obliquely inserted, deflexed, concave, lanceolate, acute or acuminate, 3–3.5 cm. long and .6–.7 cm. wide. Petals spreading, white or pale yellow, elliptic-oblanceolate, acute, 3–3.5 cm. long and 1.2–1.4 cm. wide. Lip concave, entire or obscurely or conspicuously 3-lobed when spread out, white or pale yellow, reticulated purple, 2.8–3.5 cm. long and 2–2.5 cm. wide; disk smooth, with a linear-ligular yellow callus, the free projecting apex bifid. Column semi-terete, 1.2–1.4 cm. long. Anther and pollinia typical of the genus.

Costa Rica and Panama.

CHIRIQUÍ: humid forest around Los Siguas Camp, southern slope of Cerro Horqueta, 1700 m., *Pittier 3176;* Cuesta de las Palmas, Cerro Horqueta, 1700–2100 m., *Pittier 3214, Maxon 5510;* vic. Bajo Chorro, rain forest, 6000 ft., *Davidson 93;* trail from Cerro Punta to the headwaters of the Río Caldera, 2250–2500 m., *Allen 1462.*

A somewhat variable species, the flowers reminiscent of those of *Chondrorhyncha discolor,* but readily separable by the reticulated color pattern and narrow, bifid callus of the lip.

3. CHONDRORHYNCHA **costaricensis** (Schltr.) P. H. Allen, comb nov.

Kefersteinia costaricensis Schltr. in Beih. Bot. Centralbl. 36^2:413. 1918.

Dwarf tufted epiphytic herbs without pseudobulbs, 12–18 cm. tall. Leaves plicate, lanceolate, acuminate, 10–18 cm. long and 1.5–2 cm. wide. Inflorescences of slender, arching or semi-pendulous scapes 2.5–4 cm. long, from the base of the leaves. Flowers small, solitary. Sepals subequal, spreading, white or cream, the dorsal sepal elliptic-lanceolate, acute or subacute, 8–10 mm. long and 4–5 mm. wide, lateral sepals rather obliquely elliptic-lanceolate, acute or apiculate, 10–12 mm. long and 5–6 mm. wide. Petals subequal to the dorsal sepal, white or cream, often spotted maroon, obliquely oblong, acute, 7–9 mm. long and 4–5 mm. wide. Lip entire, suborbicular, contracted at the base and adnate to the foot of the column, 8–10 mm. long and 7–8 mm. wide, white or cream, spotted maroon, the apex entire or with an obtuse apicule; disk with an erect pedicellate callus, the apex 2-scutellate. Column erect, 5–7 mm. long, the apex broadly clavate, the ventral surface with a longitudinal keel which is expanded into a broad biauriculate, abruptly apiculate plate below the narrow transverse stigma. Anther terminal, operculate, incumbent, 1-celled.

Costa Rica and Panama.

COLÓN: Río Llano Sucio, vic. Puerto Pilón, about 65 m., *H. P. Butcher s. n.* (under *Allen 2457*).

Known in Panama from a single fragmentary specimen preserved in liquid. Our material shows some slight differences from the Costa Rican type, notably in the subrhombic rather than scutellate divisions of the apex of the basal callus, and the apparently fleshier winged plate below the stigma, which has a more prominent central spur or apicule. Although it has been decided to consider our specimen as representing *Chondrorhyncha costaricensis,* it would seem well to note that this, and apparently one or two other species from outside our range, exhibit a radical departure from the typical concept of either *Chondrorhyncha* or *Kefersteinia* in the conspicuously pedicellate basal callus of the lip and the broad plate on the under-side of the column below the stigma. It seems possible that these may actually represent an unrecognized entity of generic rank. Unfortunately, these characters are not always easily seen in dried specimens. However, the necessity for adequate material to show points of difference in no way alters the basic fact that they may exist.

Due to our present very limited and somewhat fragmentary material, it is thought best to follow established usage for the purposes of this treatment.

4. CHONDRORHYNCHA **discolor** (Lindl.) P. H. Allen, comb. nov.

Warrea discolor Lindl. in Jour. Hort. Soc. Lond. 4:265. 1849.
Warscewiczella discolor (Lindl.) Rchb. f. in Bot. Zeit. 10:636. 1852.
Zygopetalum discolor (Lindl.) Rchb. f. in Walp. Ann. 6:655. 1861.

Erect, tufted, epiphytic or pseudo-terrestrial herbs without pseudobulbs, 20–35 cm. tall, the plants typical of the genus. Inflorescences of slender, erect or arching, 1-flowered scapes 7–15 cm. long, produced from the axils of the lower non-foliaceous bracts. Flowers relatively large and conspicuous, sometimes nodding. Sepals membranaceous, subequal, free, spreading, white, often with yellowish apices, dorsal sepal erect, elliptic-lanceolate, acute, the apex recurved, 2.8–3 cm. long and 1.0–1.5 cm. wide, laterals deflexed, concave, lanceolate, acute, 3–3.2 cm. long and .8–1.0 cm. wide. Petals spreading, elliptic, obtuse to subacute, white, often suffused with purple toward the apex, 2.5–3 cm. long and 1.2–1.5 cm. wide. Lip cucullate, obscurely to conspicuously 3-lobed when spread out, 2.5–3.2 cm. long and 2.2–3 cm. wide, deep violet-purple, sometimes with narrow whitish margins, lateral lobes or margins erect and incurving over the column, the apex suborbicular and slightly retuse; disk with a radiate, digitate, plurisulcate callus, the free projecting apex with elongate teeth of unequal length. Column short, semiterete, narrowly clavate, 10–12 mm. long, white, sometimes blotched with purple. Anther and pollinia typical of the genus.

Cuba, Costa Rica, and Panama.

CHIRIQUÍ: without definite locality, 4500–5500 ft., *Powell 155;* upper Río Chiriquí Viejo, vic. Monte Lirio, *G. White 42;* llanos and slopes of Chiriquí Volcano and along the Río Chiriquí Viejo, 1200 m., *Allen 914.*

A very frequent species of the Chiriquí highlands, where the plants are often found in association with those of *Odontoglossum Schlieperianum,* as epiphytes on low trees or sometimes as pseudo-terrestrials on boulders and steep mossy banks.

5. CHONDRORHYNCHA LACTEA (Rchb. f.) L. Wms. in Caldasia 5:16. 1942.

Zygopetalum lacteum Rchb. f. in Gard. Chron. 1290. 1872.
Kefersteinia lactea Rchb. f. apud B. D. Jackson in Index Kew. 2:4. 1895.

Epiphytic herbs without pseudobulbs, the plants usually consisting of tufted clusters of several distichous crowns of relatively broad plicate leaves, which are oblong to elliptic-lanceolate, acute, 6–12 cm. long and 1.2–2 cm. wide, the basal portions somewhat contracted into a stout petiole. Inflorescences very short, filiform, more or less arching, or erect scapes about 1.5 cm. long, produced from the lower leaf axils. Flowers small, solitary. Sepals subequal, free, spreading, elliptic-lanceolate, obtuse to subacute, 8–10 mm. long and 3–4 mm. wide. Petals subequal to the sepals, elliptic-lanceolate, acute, 7–9 mm. long and 3–4 mm. wide. Lip undivided, suborbicular, 6–10 mm. long and 6–10 mm. wide when spread out,

abruptly contracted at the base into a short claw which is apparently articulated with the base of the column, the apex entire, shallowly emarginate or with an obtuse apicule; disk with a low, fleshy, sessile, bifid callus. Column semi-terete, 5–6 mm. long, the ventral surface below the stigma with a longitudinal keel. Anther and pollinia typical of the genus.

Costa Rica and Panama.

CHIRIQUÍ: without definite locality, *Wallis s. n.*

The species was described by Reichenbach from plants presumably collected in Chiriquí Province, the actual locality being unknown. Since there have been several subsequent collections from the Pacific slope in adjacent Costa Rica, there is every reason to believe that this rather obscure record may be good.

6. CHONDRORHYNCHA **marginata** (Rchb. f.) P. H. Allen, comb. nov.

Warczewiczella marginata Rchb. f. in Bot. Zeit. 10:636. 1852.
Huntleya marginata Hort. ex Rchb. f. loc. cit. 1852.
Warrea marginata Rchb. f. loc. cit. 1852.
Warrea quadrata Lindl. in Gard. Chron. 647. 1853.
Warscewiczella velata Rchb. f. in Bot. Zeit. 23:99. 1865.
Zygopetalum quadratum Pfitz. Vergl. Morph. Orch. 58. 1881.
Chondrorhyncha Lipscombiae Rolfe, in Kew Bull. 133. 1912.

Tufted epiphytic herbs without pseudobulbs. Leaves 5–7, linear, elliptic-oblanceolate, acute, 12–30 cm. long and 2–4.5 cm. wide, firm, arching, contracted below into conduplicate petioles the lowest pair being little more than foliaceous bracts. Inflorescences of slender, arching or semi-pendulous, 1-flowered scapes, 5.5–10 cm. long, from the axils of the lowest non-foliaceous bracts. Flowers the largest of the genus in Panama, with a very agreeable and characteristic fragrance during the morning hours, reminiscent of cinnamon or cloves. Sepals subequal, free, membranaceous, elliptic-lanceolate, acute, white, the dorsal sepal erect, somewhat concave, the apex recurved, 2.2–3 cm. long and .9–1.2 cm. wide, the laterals usually more or less conduplicate, obliquely reflexed, 2.8–3.2 cm. long and .8–1.0 cm. wide. Petals membranaceous, spreading, white, usually with a lavender median line, elliptic-lanceolate, acute, 2.5–3 cm. long and 1.0–1.2 cm. wide, the apices recurved. Lip white, with a conspicuous pattern of radiating, often divaricate, lavender or pinkish lavender lines, cucullate, subquadrate to obscurely 3-lobed when spread out, 3.5–4.5 cm. long and 3–3.5 cm. wide, contracted at the base and adnate to the short column foot, the lateral lobes or margins erect and incurved over the column, the frontal margin broadly spreading, often suffused with lavender or pinkish lavender, entire, or emarginate at the apex; the disk between the erect lateral lobes or margins with a broadly spreading, fleshy, plurisulcate callus, white striped lavender, the lateral margins of which are thickened and confluent with the erect lateral lobes of the lip and the apex more or less broadly truncate, free, the many short projecting teeth all of about equal length. Column semi-terete below, dilated and broadly clavate above, pure white, 12–18 mm. long. Anther terminal, operculate, incumbent, 1-celled.

Fig. 176. *Chondrorhyncha marginata*

Panama and Colombia.

CANAL ZONE: Cacao Plantation, near Summit, *Lipscomb s. n.*; Summit, *Powell 3483*; Barro Colorado Island, *J. Zetek s. n.*; vic. Frijoles, *Powell 3460*; Gatún Lake region, *Powell 11, 47*; Cacao Plantation, vic. Summit, *Florence & James Barrett s. n.* PANAMÁ: western arm of the Quebrada Salamanca, 70 m., *Dodge, Steyermark & Allen 16989.* COCLÉ: damp shaded valleys south of El Valle de Antón, 600 m., *Allen 2843.*

A fairly frequent and attractive species, found in damp shaded locations usually at low elevations.

63. PESCATOREA Rchb. f.

PESCATOREA Rchb. f. in Bot. Zeit. 10:667. 1852; Benth. & Hook. Gen. Pl. 3:543. 1883.

Erect, tufted, epiphytic herbs without pseudobulbs. Leaves plicate, contracted below into conduplicate imbricating petioles, which are distichously arranged in the form of an open fan. Inflorescences of short, slender, arching, 1-flowered scapes produced from the axils of the non-foliaceous basal bracts. Flowers relatively large and conspicuous. Sepals more or less fleshy, subequal, concave, the dorsal sepal erect, free, the laterals connate at the base and obliquely inserted on the column foot. Petals subequal to the sepals. Lip rather fleshy, 3-lobed, abruptly contracted at the base into a conspicuous ligular claw which is continuous with the foot of the column, the limb forming an obtuse angle with the column foot, the base apparently with a deep concavity below the column, surrounded by an erect semicircular plurisulcate callus; apical lobe of the lip more or less convex or ventricose, the lateral margins often recurved. Column stout, semi-terete, produced at the base into a short foot. Anther terminal, operculate, incumbent, 1-celled; pollinia 4, waxy.

A small genus of tufted pseudobulbless epiphytes, ranging from Costa Rica to Colombia. The genus is sometimes considered as being referable to *Warscewiczella*, and has been so treated in the main generic key.

In the exceedingly perplexing association of closely allied generic concepts embracing *Bollea, Chondrorhyncha, Kefersteinia, Huntleya, Pescatorea, Warscewiczella*, and *Zygopetalum*, it becomes largely a matter of individual opinion which are to be rejected and which retained. Probably something very nearly approaching a logical treatment of the situation was proposed by Reichenbach *filius* (in Walp. Ann. 6:650–662. 1863) in his reduction of nearly all of these to sections of *Zygopetalum*. This solution has never been universally accepted, however, the more recent tendency being to recognize some as valid genera and to reduce others to synonymy. Here, as in most other cases of a similar nature, no hard-and-fast rule can be applied. Most genera, when examined critically, are found to be more or less arbitrary segregations, and should be recognized as being conveniences and a means to an end.

Dr. Louis O. Williams has suggested that *Kefersteinia* is referable to *Chondrorhyncha*, a view in which I, for the most part, concur since the generic type,

K. graminea (Lindl.) Rchb. f., and most of the subsequently described species are structurally nearly identical with *Chondrorhyncha;* yet there are other Kefersteinias, notably *K. costaricensis* Schltr., which differ radically from this generic concept. The type species of *Warszewiczella, W. discolor* (Lindl.) Rchb. f., also is almost identical with the earlier *Chondrorhyncha*, and apparently should be reduced; but not including *Pescatorea*, which seems to have ample characters upon which to base segregation. For the purposes of this treatment, the following alternate key is proposed for the separation of the genera in our area:

KEY TO THE GENERA

a. Plants with pseudobulbs. Inflorescences racemose, several- to many-flowered..... 61. ZYGOPETALUM

aa. Plants without pseudobulbs. Inflorescences of short 1-flowered scapes.

b. Lip truly clawed at the base, explanate or convex, never cucullate.

c. Apex of the column semiterete, never with broad projecting lateral wings. Basal callus plurisulcate, never fimbriate..... 63. PESCATOREA

cc. Apex of the column with broad projecting lateral wings, forming a conspicuous hood over the clinandrium. Basal callus fimbriate.... 64. HUNTLEYA

bb. Lip obscurely clawed at the base, usually convex or cucullate, rarely explanate..... 62. CHONDRORHYNCHA

1. PESCATOREA CERINA (Lindl.) Rchb. f. in Bot. Zeit. 10:667. 1852.

Huntleya cerina Lindl. & Paxt. in Paxton's Flow. Gard. 3:62. 1852–53.
Zygopetalum cerinum (Lindl.) Rchb. f. in Walp. Ann. 6:651. 1863.

Tufted epiphytic herbs without pseudobulbs. Leaves erect or arching, plicate, subcoriaceous, linear-lanceolate to elliptic-lanceolate, acute or acuminate, 15–60 cm. long and 3–5 cm. wide. Inflorescences of short, 1-flowered, erect or arching scapes 3.5–10 cm. long, from the axils of the basal non-foliaceous bracts. Flowers large and conspicuous. Sepals subequal, rather fleshy, concave, spreading, the dorsal sepal free, white, linear-elliptic to obovate, obtuse, 2.5–3.2 cm. long and 1.6–1.8 cm. wide, laterals somewhat connate at the base, obliquely inserted on the column foot, white with a long greenish-yellow blotch near the base, elliptic-lanceolate to oblanceolate, obtuse, 2.5–3.5 cm. long and 1.8–2 cm. wide. Petals spreading, subequal to the dorsal sepal, white, inserted on the base of the column, spatulate to oblanceolate, obtuse, 2.5–3 cm. long and 1.5–1.8 cm. wide. Lip rather fleshy, 3-lobed, 2–3 cm. long and about 2.5 cm. wide, rich yellow, the basal callus marked reddish brown, abruptly contracted at the base into a conspicuous ligular claw which is continuous with the column foot, the limb forming an obtuse geniculate angle with the claw, the subfalcate lateral lobes resting against the base of the column, forming a deep concavity which is surrounded by a conspicuous erect, semicircular, plurisulcate callus, the frontal lobe convex to slightly ventricose, the apical margins often reflexed. Column short, stout, white, semiterete, 1.3–1.5 cm. long, produced at the base into a short foot. Anther terminal, lavender.

Costa Rica and Panama.

PANAMÁ: Cerro Campana, in cloud forest near summit, 2500–3000 ft., *Allen 4447,*

Fig. 177. *Pescatorea cerina*

5169. COCLÉ: vic. La Mesa, region north of El Valle de Antón, 1000 m., *Allen 2362*. VERAGUAS: forested slopes of Cerro Tuté, region west of Santa Fé, 2500–3000 ft., *Allen 4564, 5171*. CHIRIQUÍ: without definite locality, 4500 ft., *Purdom s. n.*

An attractive species of the wet highland forests of the Pacific slope, usually being found in shaded situations at about 3000 ft. elevation.

64. HUNTLEYA Batem. ex Lindl.

HUNTLEYA Batem. ex Lindl. in Bot. Reg. 23: post *t. 1991*. 1837; Benth. & Hook. Gen. Pl. 3:543. 1883.

Erect, tufted, epiphytic herbs without pseudobulbs. Leaves plicate, subcoriaceous, linear-lanceolate, acute, the bases somewhat conduplicate and imbricating, distichously arranged in the form of a fan. Inflorescences of slender, elongate, erect, 1-flowered scapes produced from the axils of the central leaves. Flowers large and conspicuous. Sepals rather fleshy, subequal, spreading, the dorsal sepal free, the laterals connate at the base and obliquely inserted on the column foot. Petals rather fleshy, spreading, subequal to the sepals, inserted on the foot of the column. Lip fleshy, abruptly contracted at the base, with a conspicuous claw which forms a geniculate angle with the column foot; the basal callus with an erect, semicircular, fimbriate margin, the apical lobe articulated with the base of the callus plate. Column short, somewhat arcuate, the apex dilated, with a dorsal keel, the lateral margins broadly winged and confluent at the apex, forming a conspicuous hood over the clinandrium. Anther terminal, operculate, incumbent, 1-celled or imperfectly 2-celled; pollinia 4, waxy.

About three or four species of American epiphytes, ranging from Costa Rica to Brazil. They often are listed as Zygopetalums. One species is known from Panama.

1. HUNTLEYA MELEAGRIS Lindl. in Bot. Reg. 23: post *t. 1991*. 1837.

Batemannia Burtii Endres & Rchb. f. in Gard. Chron. 1099. 1872.
Zygopetalum meleagris Benth. in Jour. Linn. Soc. 18:321. 1880.
Zygopetalum Burtii Benth. & Hook. ex Hemsl. Biol. Centr.-Amer. Bot. 3:251. 1883.
Huntleya Burtii (Endres & Rchb. f.) Rolfe, in Orch. Rev. 24:236. 1916.

Erect, tufted, epiphytic herbs without pseudobulbs. Leaves plicate, subcoriaceous, linear-lanceolate to elliptic-lanceolate, acute, 15–30 cm. long and 3–4.5 cm. wide. Inflorescences of erect 1-flowered scapes 10–15 cm. tall produced from the axils of the central leaves. Flowers large and conspicuous. Sepals subequal, fleshy, spreading, elliptic-lanceolate, acute to acuminate, the margins undulate, the apical ⅔ a waxy reddish brown, usually with some yellow spots, the basal ⅓ white or pale yellow, the dorsal sepal free, 4–6 cm. long and 2–2.5 cm. wide, the laterals connate at the base and obliquely inserted on the column foot, 4.5–6 cm. long and 1.5–2.5 cm. wide. Petals fleshy, spreading, subequal and colored similarly to the sepals, with purple blotches or streaks at the base near the insertion on the column foot, broadly elliptic-lanceolate, acuminate, with undulate margins, 3.5–5.6 cm. long and 2–3 cm. wide. Lip fleshy, the base nearly white or yellowish, the frontal half of the apical lobe usually a rich waxy reddish brown or brownish purple, 2.5–3.5 cm. long and 2–3 cm. wide, the base of the lip abruptly contracted, with a conspicuous claw which forms a geniculate angle with the foot of the column, the basal callus with an erect semicircular fimbriate crest, the posterior margins of which are incumbent on the foot of the column, the apical lobe obscurely 3-

Fig. 178. *Huntleya meleagris*

lobulate, obovate, acute to acuminate, contracted at the base and articulated with the apex of the callus plate, the lateral lobules rounded, spreading, the apical lobule broadly triangular, the acuminate apex recurved. Column stout, erect, 1.5–2 cm. long, semiterete below, dilated above, with a conspicuous dorsal keel and broad lateral wings which are confluent at the apex, forming a hood over the clinandrium. Anther terminal, operculate, incumbent, imperfectly 2-celled.

Costa Rica, Panama, Colombia, and Brazil.

COCLÉ: western slope and summit of Cerro Valle Chiquito, 700–800 m., *Seibert 643;* trail to Las Minas, region north of El Valle de Antón, 1000 m., *Allen 2894.*

A rare species of the wet highland forests, growing in deep shade at elevations above 2500 ft. The plants are often associated with a *Brassia* of nearly identical vegetative appearance, and are exceedingly difficult to distinguish when not in flower. The conduplicate bases of the leaves of the *Brassia* are often slightly broader below the suture line, while those of the *Huntleya* are of uniform width. The Central American plants have hitherto been called *Huntleya Burtii*, but other than some slight difference in size and color our material seems identical with specimens collected in Brazil.

65. MAXILLARIA Ruiz & Pavon

MAXILLARIA Ruiz & Pavon, Fl. Peruv. & Chil. Prodr. 116, *t. 25.* 1794; Lindl. in Bot. Reg. n. s. 6: Misc. 10. 1843; Benth. & Hook. Gen. Pl. 3:555. 1883.

Ornithidium Salisb. in Trans. Hort. Soc. Lond. 1:293. 1812.
Camaridium Lindl. in Bot. Reg. 10: *t. 844.* 1824.
Psittacoglossum La Llave & Lex. Nov. Veg. Desc. 2:29. 1825.
Heterotaxis Lindl. in Bot. Reg. 12: *t. 1028.* 1826.
Dicrypta Lindl. Gen. & Spec. Orch. Pl. 44. 1830.
Menadena Raf. Fl. Tellur. 2:98. 1836.
Onkeripus Raf. loc. cit. 4:42. 1836.
Pentulops Raf. loc. cit. 4:42. 1836.

Epiphytic herbs with very short to elongate, often branching, erect, arching or pendulous stems, with or without clustered or distant, 1- to 3-leaved pseudobulbs. Leaves persistent, conduplicate in vernation, usually coriaceous or fleshy, rarely thin, usually strap-shaped, without prominent veins. Inflorescences of 1 to many, reduced to elongate, 1-flowered scapes from the bases of the pseudobulbs, from the axils of the leaves, or the flush of new growth. Flowers small to large and conspicuous. Sepals subequal, free, or the laterals somewhat connate at the base, adnate to the foot or base of the column, often forming a short mentum. Petals subequal to the sepals or somewhat smaller. Lip concave, 3-lobed or entire, sessile or contracted at the base into a short claw, articulated with or adnate to the foot or base of the column, lateral lobes or margins erect, the mid-lobe membranaceous or thickened, spreading or reflexed; disk rarely without a fleshy callus. Column erect, semi-terete, somewhat arcuate, not winged, the base with a short foot, or footless. Anther terminal, operculate, incumbent, 1-celled or imperfectly 2-celled; pollinia 4, waxy.

About 250 species of tropical American epiphytes, ranging from Mexico to Peru, Brazil, and the West Indies. As would be expected from a large group of plants having a great geographic range, they vary considerably in size and vegetative habit. The species can roughly be separated into two main divisions. In the first division the pseudobulbs are conspicuously present, either as sessile clusters or distributed along the rhizome; while in the second division the pseudobulbs are inconspicuous or entirely absent, the plants usually either erect canes with 2-ranked foliage, or with sessile clusters of leaves in the form of a fan. However, there are many species in which conspicuous pseudobulbs are at first produced at the base, the subsequent growth becoming elongate, often branching or scandent, lacking pseudobulbs, or with pseudobulbs small and hidden by the imbricating leaf bases. Plants of some of these modified types are often indistinguishable from those of *Camaridium* and *Ornithidium*, the first of which in particular is a highly technical and arbitrary generic concept. In accordance with recently accepted usage, both of these are here considered to be Maxillarias. At the present time, some 41 species are known from Panama.

a. Secondary stems usually conspicuously thickened into pseudobulbs. (See also section aa.)
  b. Plants caespitose. Rhizome very short; pseudobulbs erect, usually congested (rarely solitary), apex monophyllous.
    c. Bracts enveloping the base of the pseudobulb conspicuously foliaceous.
      d. Bases of the foliaceous bracts completely covering the poorly developed pseudobulb ..... 14. M. CRASSIFOLIA
      dd. Bases of the foliaceous bracts covering only the basal half of the well-developed pseudobulb.
        e. Plants small. Foliaceous bracts 1–2. Sepals 5 mm. wide or less. Mentum elongate ..... 13. M. CONFUSA
        ee. Plants large. Foliaceous bracts 3 or more. Sepals 8 mm. wide or more. Mentum short ..... 25. M. MALEOLENS
    cc. Bracts enveloping the bases of the pseudobulbs not or apparently not foliaceous.
      d. Mid-lobe of the lip ½ or more of the total length of the lip.
        e. Apices of the lateral lobes of the lip acute, conspicuously projecting ..... 35. M. RUFESCENS
        ee. Apices of the lateral lobes of the lip not acute, not conspicuously projecting ..... 16. M. CUCULLATA
      dd. Mid-lobe of the lip less than ½ the total length of the lip.
        e. Pseudobulbs complanate-cylindric, apparently continuous with the leaf petiole ..... 5. M. ARACHNITIFLORA
        ee. Pseudobulbs ovoid to elliptic-ovoid, compressed, but never cylindric, broader than the leaf petioles.
          f. Plants small, up to 25 cm. tall.
            g. Mid-lobe about ½ the total length of the lip. Apex of the pseudobulb subacute ..... 23. M. LONGIPETIOLATA
            gg. Mid-lobe about ⅓ the total length of the lip. Apex of the pseudobulb broadly truncate.
              h. Mentum short, acute. Sepals acute, 15 mm. or less long ..... 9. M. BREVIPES
              hh. Mentum elongate, acuminate. Sepals acuminate, 17 mm. or more long ..... 13. M. CONFUSA
          ff. Plants large, more than 25 cm. tall (usually much taller).
            g. Flowers relatively large. Sepals 4 cm. or more long.
              h. Sepals obtuse to subacute, about 10 mm. wide ..... 24. M. LUTEO-ALBA
              hh. Sepals acuminate, about 6 mm. wide ..... 3. M. ANGUSTISEGMENTA
            gg. Flowers relatively small. Sepals 3.5 cm. or less long.

h. Mid-lobe about ½ the total length of the lip. Apex of the pseudobulb subacute..... 23. M. LONGIPETIOLATA
hh. Mid-lobe about ⅓ the total length of the lip. Apex of the pseudobulb broadly truncate.
i. Sepals 2.5 cm. long or more..... 34. M. RINGENS
ii. Sepals 2 cm. long or less..... 32. M. POWELLII
bb. Plants caulescent. Rhizomes or canes elongate, sometimes branching; pseudobulbs approximate or distant, usually inserted on the rhizome at an oblique angle, sometimes confined to the base of the plant, erect, solitary or clustered.
c. Pseudobulbs distributed along the rhizome, approximate, the internodes not equaling the length of the pseudobulbs, often more or less imbricating (i. e., with the base of each pseudobulb covered by the apical portion of that preceeding it).
d. Flowers produced from the base of the current mature pseudobulb.
e. Bracts enveloping the bases of the pseudobulbs foliaceous.
f. Apical lobe of the lip about ⅔ of the total length..... 38. M. VAGANS
ff. Apical lobe of the lip about ⅓ of the total length..... 28. M. OREOCHARIS
ee. Bracts enveloping the bases of the pseudobulbs not or apparently not foliaceous.
f. Pseudobulbs minute, usually completely hidden by the papery imbricating bracts. Leaves very fleshy, subulate-conduplicate, rarely lanceolate-elliptic. Lip concave, entire, linear-spatulate..... 37. M. UNCATA
ff. Pseudobulbs conspicuous, not hidden by the bases of the imbricating bracts. Leaves coriaceous, ligular, or subulate-conduplicate. Lip entire or 3-lobed.
g. Scapes very short, in dense subsessile fascicles. Flowers enclosed in 2 conspicuous glumaceous bracts. Sepals broadly ovate, about 6 mm. long. Lip 3-lobed. Column footless..... 27. M. NEGLECTA
gg. Scapes conspicuously pedicellate, solitary or in loose fascicles. Sepals acute or obtuse. Lip entire, or obscurely 3-lobed. Column produced into a distinct foot.
h. Apex of the pseudobulbs 2- to 3-leaved. Scapes usually loosely fasciculate. Sepals acuminate..... 20. M. FRIEDRICHSTHALII
hh. Apex of the pseudobulbs monophyllous. Scapes usually solitary.
i. Leaves 25 cm. or more long. Pseudobulbs strongly ancipitous. Sepals acute to acuminate..... 28. M. OREOCHARIS
ii. Leaves 15 cm. long or less. Pseudobulbs usually not strongly ancipitous. Sepals broadly obtuse..... 40. M. VARIABILIS
dd. Flowers produced from the bract axils of the flush of new growth.
e. Leaves 25 cm. or more long.
f. Bracts of the flush of new growth acuminate. Mid-lobe of the lip conspicuously thickened..... 1. M. ALBA
ff. Bracts of the flush of new growth broadly obtuse. Mid-lobe of the lip not conspicuously thickened..... 10. M. CAMARIDII
ee. Leaves 18 cm. long or less.
f. Lip conspicuously 3-lobed, the mid-lobe more than ½ the total length of the lip..... 38. M. VAGANS
ff. Lip obscurely 3-lobed, the mid-lobe about ⅓ the total length of the lip..... 40. M. VARIABILIS
cc. Pseudobulbs distant to very distant on the rhizome, or confined to the base of the plant.
d. Pseudobulbs distant to very distant on the rhizome.
e. Flowering scapes produced from the axils of the current flush of new growth.
f. Pseudobulbs diphyllous.

g. Leaf petioles very short, the apices of the leaves obtuse. Bracts of the flush of new growth broadly obtuse..... 10. M. CAMARIDII
gg. Leaf petioles elongate, the apices of the leaves acute. Bracts of the flush of new growth acuminate..... 15. M. CTENOSTACHYA
ff. Pseudobulbs monophyllous.
g. Flowers minute, the sepals less than 8 mm. long.
h. Pseudobulbs suborbicular..... 26. M. MINOR
hh. Pseudobulbs linear..... 41. M. WERCKLEI
gg. Flowers of moderate size, the sepals more than 8 mm. long.
h. Pseudobulbs linear. Leaves less than 3 cm. long..... 41. M. WERCKLEI
hh. Pseudobulbs elliptic-ovate to elliptic-oblong. Leaves more than 6 cm. long.
i. Lip conspicuously 3-lobed when spread out.
j. Mid-lobe about ⅓ the total length of the lip..... 1. M. ALBA
jj. Mid-lobe more than ½ the total length of the lip.
k. Lateral lobes of the lip subfalcate, the mid-lobe acute to acuminate. Sepals acuminate..... 36. M. UMBRATILIS
kk. Lateral lobes of the lip rounded or broadly acute, the mid-lobe obtuse or subacute. Sepals acute..... 38. M. VAGANS
ii. Lip entire or obscurely 3-lobed, subpandurate when spread out..... 18. M. DIUTURNA
ee. Flowering scapes produced from the base of the current mature pseudobulb.
f. Flowers small, produced in dense subsessile fascicles. Column without a foot..... 27. M. NEGLECTA
ff. Flowers of moderate size, usually 1–3, each flower solitary in the bract axil, never produced in dense subsessile fascicles. Column with a distinct foot.
g. Leaves linear, elongate, less than 1 cm. wide. Sepals about 1.5 cm. long..... 28. M. OREOCHARIS
gg. Leaves broadly ligular, more than 3 cm. wide. Sepals about 3.5 cm. long..... 31. M. PLANICOLA
dd. Pseudobulbs confined to the base of the plant.
e. Flowers large and conspicuous. Sepals 3.5 cm. long or more.
f. Lip obscurely 3-lobed, about 1.5 cm. long..... 22. M. INAUDITA
ff. Lip conspicuously 3-lobed, about 1 cm. long..... 8. M. BRADEORUM
ee. Flowers small. Sepals 1.5 cm. long or less.
f. Sepals broadly ovate. Lip geniculate, sigmoid when seen in profile..... 21. M. FULGENS
ff. Sepals acute to acuminate, not broadly ovate. Lip not geniculate nor sigmoid in profile.
g. Lip distinctly 3-lobed, lateral lobes auriculate, erect..... 6. M. BIOLLEYI
gg. Lip entire..... 30. M. PITTIERI
aa. Secondary stems not, or rarely, or obscurely thickened into pseudobulbs, or the pseudobulbs confined to the base of the plant.
b. Plants caespitose.
c. Leaf bases conduplicate, imbricating, distichously arranged in the form of a broad fan.
d. Leaves fleshy. Flowers with short pedicels, subsessile in the central leaf axils.
e. Leaves many, equitant, gladiate, acuminate. Plants pendent.... 39. M. VALENZUELANA
ee. Leaves few, ligular, acute or obtuse, the conduplicate bases completely enveloping a small pseudobulb. Plants erect.
f. Plants more than 15 cm. tall. Leaves more than 15 mm. wide..... 14. M. CRASSIFOLIA
ff. Plants less than 10 cm. tall. Leaves less than 10 mm. wide.. 7. M. BRACHYBULBON
dd. Leaves subcoriaceous. Flowers with long pedicels, produced from the axils of the basal conduplicate bracts..... 11. M. CHARTACIFOLIA
cc. Leaf bases contracted below into narrow sheathing petioles, or apparently so.

d. Leaves fleshy, obtuse, with short, conduplicate, imbricating petioles. Inflorescences subsessile in the leaf axils..... 14. M. CRASSIFOLIA
dd. Leaves coriaceous, acute or acuminate. Flowers usually long-pedicellate, rarely subsessile in the leaf axils.
e. Leaves broad, 2.5 cm. wide or more. Flowers large, the sepals 4 cm. long or more..... 5. M. ARACHNITIFLORA
ee. Leaves narrow, .8 cm. wide or less. Flowers small, the sepals 2.5 cm. long or less.
f. Plants dwarf, usually less than 6 cm. tall..... 7. M. BRACHYBULBON
ff. Plants elongate, leaves 45 cm. or more long..... 4. M. ANGUSTISSIMA
bb. Plants caulescent, the elongate canes or rhizomes repent, erect or pendulous, sometimes with pseudobulbs at the base. Leaves 2-ranked on the stem.
c. Canes or rhizomes undivided, or apparently so.
d. Plants dwarf, 15 cm. tall or less.
e. Leaves acute or acuminate..... 37. M. UNCATA
ee. Leaves obtuse, or the apices retuse..... 41. M. WERCKLEI
dd$_1$ Plants more than 25 cm. tall.
e. Leaves forming a distichous, fasciculate cluster at the apex of the stems, the imbricating bases sometimes enveloping a small pseudobulb..... 21. M. FULGENS
ee. Leaves equidistantly distributed along the upper stems, the bases not fasciculate.
f. Leaves 9 cm. long or less, the apex retuse. Flowers small, the sepals 1.5 cm. long or less.
g. Sepals about 1.5 cm. long. Lip conspicuously 3-lobed, the basal lobes auriculate, erect, the apical lobe large, broadly obtuse..... 6. M. BIOLLEYI
gg. Sepals about 1 cm. long. Lip linear, concave, rather obscurely 3-lobed, the apical lobe small, acute..... 2. M. ALLENII
ff. Leaves 15 cm. or more long, the apex broadly obtuse to acuminate. Flowers relatively large, the sepals 2.5 cm. long or more.
g. Lip about 9 mm. long, conspicuously 3-lobed, the lateral lobes acute, broadly triangular to subfalcate..... 8. M. BRADEORUM
gg. Lip about 15 mm. long, rather obscurely 3-lobed.
h. Leaves acuminate, 1.5 cm. or less wide, the bases tightly clasping the cylindric canes..... 19. M. EXALTATA
hh. Leaves broadly obtuse, 3.5 cm. or more wide, the persistent bases conspicuously flattened..... 22. M. INAUDITA
cc. Canes or rhizomes branching.
d. Rhizome repent, rooting freely from the bases of the caespitose leaf clusters, which are distant or terminal on the stems..... 33. M. REPENS
dd. Canes erect or pendent, not freely rooting from caespitose leaf clusters, the leaves equidistantly distributed on the stems.
e. Plants dwarf, 15 cm. or less tall.
f. Leaves coriaceous, elliptic, broadly obtuse..... 41. M. WERCKLEI
ff. Leaves fleshy, subulate-conduplicate, or rarely lanceolate, acute, never broadly obtuse..... 37. M. UNCATA
ee. Plants 30 cm. or more tall.
f. Canes slender. Leaves very short, 6 cm. or less long (usually much less)..... 17. M. DENDROBIOIDES
ff. Canes relatively stout. Leaves 10 cm. long or more.
g. Flowers conspicuously pedicellate; sepals over 15 mm. long. Column with a distinct foot..... 29. M. PARVILABIA
gg. Flowers in dense subsessile fascicles; sepals 10 mm. or less long. Column without a foot. Plants usually with an ovoid pseudobulb at the base.
h. Lip geniculate, sigmoid in profile.
hh. Lip not geniculate, not sigmoid in profile.
i. Apex of the lip 2-lobed..... 12. M. CONDUPLICATA
ii. Apex of the lip subaristate..... 30. M. PITTIERI

1. MAXILLARIA ALBA (Hook.) Lindl. Gen. & Spec. Orch. Pl. 143. 1832.

Dendrobium album Hook. Exot. Fl. *t. 142*. 1823–1827.
Broughtonia alba Spreng. Syst. Veg. 735. 1826.

Epiphytic herbs with elongate, often branching, more or less pendulous, rhizomatous stems enveloped in closely imbricating, persistent, brown, papery bracts. Pseudobulbs approximate, inserted at an acute angle on the stems and more or less imbricating, linear-elliptic, strongly ancipitous, 4–5 cm. long and 2–2.5 cm. wide, the rather oblique truncate apex with a solitary leaf. Leaves ligular, coriaceous, persistent, acuminate, 25–40 cm. long and 1.5–2 cm. wide. Inflorescences short 1-flowered scapes 3–5 cm. long from the bract axils of the flush of new growth. Flowers few to about 8, relatively small, apparently produced more or less simultaneously rather than in successive flowerings as in some of the allied species. Sepals subequal, free, spreading, creamy white, ligular, acuminate, 2–2.5 cm. long and .4–.5 cm. wide, the laterals adnate to the column foot, forming a short subacute mentum. Petals subequal to the sepals, creamy white, lanceolate, acute to acuminate, 1.8–2 cm. long and .4–.5 cm. wide. Lip concave, slightly arcuate, obscurely 3-lobed, yellow; more or less elliptic-oblanceolate, acute, when spread out, 12–15 mm. long and about 5 mm. wide, contracted at the base and articulated with the foot of the column, the lateral lobes erect, the mid-lobe about ⅓ the total length of the lip, ovate, acute, somewhat thickened; disk with an elongate, ligular, fleshy callus. Column semi-terete, lightly arcuate, 7–9 mm. long, somewhat dilated and obscurely auriculate at the apex, the base produced into a distinct foot. Anther terminal, operculate, incumbent, obscurely 2-celled.

Guatemala, Honduras, Costa Rica, Panama, Cuba, Jamaica, Trinidad, British Guiana, Surinam, Brazil, and probably other adjacent territories.

PANAMÁ: hills near Panama City, sea level, *Powell 127*; vic. Juan Diaz, sea level, *Cope s. n.* (under *Allen 3822*). CHIRIQUÍ: vic. Boquete, 3800 ft., *Davidson 826*; in low woods along small streams on rocky plains about 5 miles south of Boquete, 3000 ft., *Allen 4706*.

2. MAXILLARIA ALLENII L. Wms. in Ann. Mo. Bot. Gard. 27:282 *t. 35*. 1940.

Erect epiphytic herbs without pseudobulbs, the complanate-cylindric canes 25–40 cm. tall, the lower half to two-thirds leafless and enveloped in the coarse, closely imbricating, persistent leaf bases. Leaves 2-ranked, equidistantly distributed along the upper half to third of the stem, coriaceous, ligular, emarginate, 3.5–6.5 cm. long and 1.0–2.0 cm. wide. Inflorescences slender 1-flowered scapes produced in loose fascicles from the leaf axils. Flowers small. Sepals subequal, free, not spreading, lanceolate, acute to acuminate, 7–10 mm. long and 2–2.5 mm. wide, the laterals adnate to the foot of the column, forming a very short subacute mentum. Petals subequal to the dorsal sepal, lanceolate to oblanceolate, acute, pale yellow, 6–8 mm. long and about 2.5 mm. wide. Lip slightly concave, reddish tan to reddish orange, obscurely 3-lobed, articulated at the base with the foot of the column, 6–7 mm. long and about 3 mm. wide, lateral lobes erect, the acute apices somewhat spreading, the mid-lobe about half the total length of the lip,

the acute apex somewhat thickened and with erect margins; disk with a low, fleshy, linguiform callus. Column semi-terete, somewhat arcuate, about 4 mm. long, produced at the base into a foot. Anther terminal, operculate, incumbent, 1-celled.

Panama.

PANAMÁ: forested summit of Cerro Campana, 800–1000 m., *Allen & Fairchild 3968.* COCLÉ: wet mossy forest on Cerro Pajita, hills north of El Valle de Antón, 1200 m., *Allen & Fairchild 3941;* region north of El Valle, 1000 m., *Allen 1650, 2902, 3921.*

3. MAXILLARIA ANGUSTISEGMENTA Ames & Schweinf. in Sched. Orch. 10:86. 1930.

Erect epiphytic herbs with stout ovate to rectangular-elliptic, somewhat compressed pseudobulbs 4–6 cm. tall and 1.5–3.5 cm. wide, the bases enveloped in several imbricating papery bracts which become fibrous with age, the truncate apex of the pseudobulb with a single leaf. Leaves coriaceous, persistent, the blades oblong, acute, contracted below into an elongate, conduplicate petiole, 16–50 cm. long and 2–5 cm. wide. Inflorescences usually several, erect, 1-flowered scapes 12–15 cm. tall, enveloped in several approximate, tubular, acuminate, papery bracts. Flowers large and conspicuous. Sepals subequal, free, widely spreading, yellow, linear-lanceolate, long-acuminate, 4.5–5.5 cm. long and .5–.6 cm. wide, the laterals adnate at the base to the foot of the column, forming a short mentum. Petals subequal to the sepals, white, linear-lanceolate, acuminate, the apices incurving, 4–4.5 cm. long and .35–.5 cm. wide. Lip 3-lobed, 12–15 mm. long, contracted at the base and articulated with the foot of the column, the lateral lobes elongate, erect, the anterior margins rounded, the mid-lobe about ¼ the total length of the lip, suborbicular to subquadrate, obtuse; the disk with a fleshy ligular callus. Column semi-terete, somewhat arcuate, 8–10 mm. long, produced at the base into a foot.

Costa Rica and Panama.

CHIRIQUÍ: without definite locality, *Terry 1610;* Bajo Mono, mouth of the Quebrada Chiquero and along the Río Caldera, 1500–2000 m., *Woodson, Allen & Seibert 1010.*

Our specimens vary among themselves, none agreeing entirely with the Costa Rican type, yet they seem to form an association more readily referable to that concept than to any other species, differing from *Maxillaria ringens* in the larger flowers and more robust habit, and from *Maxillaria luteo-alba* in the much more attenuate floral segments. It seems likely that this, and many others of this association, will eventually be reduced to synonymy.

4. MAXILLARIA ANGUSTISSIMA Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 3:41. 1934.

Maxillaria acutifolia Schltr. in Fedde Rep. Sp. Nov. Beih. 19:229. 1923, non Lindl.

Caespitose, usually pendulous, epiphytic herbs without pseudobulbs, the short rhizome with one to several, sometimes divaricate, clusters of long-attenuate

foliage. Leaves coriaceous, very narrow (in our specimen), 45–75 cm. long and .2–.3 cm. wide, the bases enveloped in several papery, imbricating bracts, forming a short complanate petiole. Inflorescences apparently solitary, short, 1-flowered scapes from the lower leaf axils. Sepals subequal, free, apparently not spreading (in our specimen), lanceolate, acuminate, about 2.5 cm. long and 5–6 mm. wide, the very oblique bases of the laterals adnate to the long column foot, forming a conspicuous, elongate, acuminate mentum. Petals apparently subequal to the sepals. Lip obscurely 3-lobed, concave, the slender base articulated with the column foot, the lateral lobes erect, the apical lobe spreading, about ⅓ the total length of the lip; disk with a low, fleshy, linear callus about equaling the lateral lobes in length. Column short, semi-terete, somewhat arcuate, produced at the base into a very long narrow foot.

Costa Rica and Panama.

COLÓN: summit of Cerro Santa Rita, 1200 ft., *Allen & Fairchild 5198.*

All the plants seen of this curious species have had the leaves consistently longer and narrower than in the typical Costa Rican material. The single flower of our specimen is fragmentary, and hence cannot be determined with certainty, but the plants and flowers in general aspect apparently compare better with this than with any other known species. It may be that adequate collections will prove it to be distinct.

5. MAXILLARIA ARACHNITIFLORA Ames & Schweinf. in Sched. Orch. 10:87. 1930.

Erect, caespitose, epiphytic herbs, up to about 38 cm. tall. Pseudobulbs complanate-cylindric, monophyllous, 4–5.5 cm. long and .5–1.0 cm. wide, the bases enveloped in several imbricating, sometimes foliaceous bracts. Leaves coriaceous, persistent, lanceolate, acute, 15–35 cm. long and 2.5–4.5 cm. wide, contracted below into an elongate, conduplicate petiole which is apparently continuous with the apex of the narrow pseudobulb. Inflorescences few to many erect 1-flowered scapes, 7–12 cm. tall, produced from the bases of the pseudobulbs, enveloped throughout in tubular, acuminate, papery bracts. Flowers relatively large and conspicuous. Sepals free, subequal, spreading, greenish yellow, linear-lanceolate, attenuate, 5–7.5 cm. long and .5–.6 cm. wide, the oblique bases of the laterals adnate to the column foot, forming a conspicuous acute mentum. Petals subequal to the sepals, white, erect with incurving apices, linear-lanceolate, long-acuminate, 5–6 cm. long and .4–.5 cm. wide. Lip concave, slightly arcuate, nearly entire but obscurely 3-lobed near the apex, clear yellow, oblong-ovate when spread out, 1.5–2 cm. long and .9–1.1 cm. wide, the base articulated with the foot of the column, the lateral margins erect, the apices bluntly acute, the obtuse mid-lobe somewhat thickened, with a fleshy callus on the under-side of the apex; disk with a fairly prominent, fleshy, slightly concave, linguiform callus about half the length of the lateral margins. Column short, stout, semi-terete, 6–7 mm. long, produced at the base into a very conspicuous foot which is about twice the length of the upper column.

Costa Rica and Panama.

COCLÉ: vic. El Valle de Antón, 600–1000 m., *Allen 1250;* trail to Las Minas, region north of El Valle, 1000 m., *Allen 2875.*

6. MAXILLARIA BIOLLEYI (Schltr.) L. Wms. in Ann. Mo. Bot. Gard. 28:425. 1941.

Ornithidium Biolleyi Schltr. in Fedde Rep. Sp. Nov. 9:29. 1910.
Camaridium Biolleyi Schltr. in Beih. Bot. Centralbl. 36^2:498. 1918.

Erect epiphytic herbs, 30–50 cm. tall, the stout complanate-cylindric canes enveloped below in the broad persistent leaf bases, the base of the cane often with one or more oblong-elliptic, compressed pseudobulbs, 2.5–3 cm. long and 1.5–2 cm. wide. Leaves coriaceous, spreading, 2-ranked and equidistantly distributed on the upper stem, the blades ligular, shallowly and unequally 2-lobed to acute, 7–27 cm. long and 1.5–3.5 cm. wide, the conduplicate bases closely imbricating. Inflorescences slender 1-flowered scapes, 6–9 cm. long, produced in dense fascicles from the leaf axils. Flowers small. Sepals subequal, free, spreading, white, lanceolate, acuminate, 10–12 mm. long and 3.5–4 mm. wide, the laterals somewhat obliquely inserted. Petals subequal to the sepals, rather obliquely lanceolate, acuminate, white, 9–10 mm. long and 2–3 mm. wide. Lip 3-lobed, shortly clawed at the base, red, 5–6 mm. long, the lateral lobes auriculate and erect, the mid-lobe spreading, oblong-elliptic, obtuse, about ⅔ the length of the lip; disk between the lateral lobes with a broadly obtuse, reniform, fleshy callus. Column short, stout, semi-terete, 2–2.5 mm. long, produced at the base into a very short foot.

Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, in rain forest, 6000 ft., *Davidson 125.*

7. MAXILLARIA BRACHYBULBON Schltr. in Fedde Rep. Sp. Nov. Beih. 19:55. 1923.

Dwarf, caespitose, epiphytic herbs, 3.5–8 cm. tall, usually without pseudobulbs. Leaves coriaceous, ligular to oblanceolate, obtuse, 2–4.5 cm. long and .3–.8 cm. wide, contracted below into elongate, conduplicate petioles, the bases of which are imbricating and more or less 2-ranked. Inflorescences short, usually solitary, 1-flowered scapes produced from the base of the leaves. Flowers small, but relatively large in relation to the size of the plants. Sepals subequal, free, yellow, lanceolate, acute, 12–15 mm. long and 3–4 mm. wide, the laterals obliquely inserted on the column foot, forming a short subacute mentum. Petals subequal to the dorsal sepal, lanceolate, acuminate, yellow, 10–12 mm. long and 2–2.5 mm. wide. Lip 3-lobed near the apex, red-brown, contracted below and articulated with the column foot, the lateral margins erect, the apices acute, mid-lobe fleshy, ligular, acute, minutely papillose, about ⅓ the total length of the lip. Column short, semi-terete, somewhat arcuate, about 5 mm. long, the base produced into a short foot.

Honduras, Costa Rica, and Panama.

PANAMÁ: Cerro Campana, 1000 m., *Allen 4026.*

8. MAXILLARIA BRADEORUM (Schltr.) L. Wms. in Ann. Mo. Bot. Gard. 28:425. 1941.

Camaridium grandiflorum Ames, in Proc. Biol. Soc. Wash. 34:149. 1921.
Camaridium Bradeorum Schltr. in Fedde Rep. Sp. Nov. Beih. 19:141. 1923.
Maxillaria ampliflora C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 8:188. 1940.

Erect or pendulous, epiphytic herbs, 45–75 cm. tall, with elongate, cylindric canes, the lower portion usually with inconspicuous, distant, complanate-elliptic pseudobulbs, the internodes naked or enveloped in the persistent, imbricating leaf bases, the upper stem without pseudobulbs and with 2-ranked foliage. Leaves coriaceous, ligular-lanceolate, acute, 12–27 cm. long and 2–3.5 cm. wide; the conduplicate petioles imbricating and 2-ranked on the stem. Inflorescences erect 1-flowered scapes 6.5–8 cm. tall, enveloped in several tubular, papery, acuminate bracts. Flowers relatively large and conspicuous. Sepals free, spreading, subequal, the apices recurved, white with a central rose-red blotch, to wine-red with yellowish margins, lanceolate, acuminate to long-acuminate, 3–5 cm. long and 1.0–1.2 cm. wide, the dorsal sepal with a keel, the laterals inserted on the very short column foot barely forming an obscure mentum. Petals subequal to the sepals and similarly colored, lanceolate, acuminate to long-acuminate, 2.5–4 cm. long and 7–8 mm. wide. Lip very short, 3-lobed, rich orange, 8–10 mm. long and 12–14 mm. wide when spread out, abruptly contracted at the base into a short claw which is articulated with the foot of the column, the subfalcate, acute, lateral lobes erect, the obtuse, concave mid-lobe about $\frac{2}{5}$ the total length of the lip, the lateral margins lightly incurving; the disk with a truncate, sulcate or obscurely 3-lobed fleshy callus which about equals the lateral lobes in length. Column short, semi-terete, 6–8 mm. long, the base with a very short foot.

Costa Rica and Panama.

COCLÉ: summit of Cerro Pajita, hills north of El Valle de Antón, 1200 m., *Allen & Fairchild 3942*. CHIRIQUÍ: humid forest of the cordillera east of the Río Caldera, 2000 m., *Killip 3565*; vic. Bajo Chorro, 6000 ft., *Davidson 118*.

The species is somewhat variable in regard to the presence or absence of pseudobulbs and in the size and color of the flowers.

9. MAXILLARIA BREVIPES Schltr. in Fedde Rep. Sp. Nov. Beih. 19:302. 1923.

Dwarf, erect, epiphytic herbs up to about 8 cm. tall. Pseudobulbs clustered, ovoid-complanate, 8–10 mm. tall and 6–8 mm. wide, the bases enveloped in several imbricating papery bracts, the apices monophyllous. Leaves coriaceous, elliptic-lanceolate, acute, 4–6.5 cm. long and .8–1.2 cm. wide, contracted below into slender, elongate, conduplicate petioles. Inflorescences usually solitary 1-flowered scapes, 2–2.5 cm. tall, produced from the base of the pseudobulbs. Flowers relatively small. Sepals subequal, free, apparently not spreading, white, ovate-lanceolate, acute to subacute, 10–13 mm. long and 3–4 mm. wide, the oblique bases of the laterals adnate to the column foot, forming a short, acute

Fig. 179. *Maxillaria Camaridii*

mentum. Petals subequal to the dorsal sepal, somewhat obliquely lanceolate, acute, white, 10–11 mm. long and 2.5–3.5 mm. wide. Lip concave, elliptic-obovate, subacute when spread out, reddish brown, obscurely 3-lobed near the apex, 8–10 mm. long and 4–5 mm. wide, the cuneate base articulated with the foot of the column, the lateral margins erect, the apices rounded, the mid-lobe creamy yellow, obtuse, about ⅓ the total length of the lip; disk with a linear, obtuse, yellow callus about equaling the lateral margins in length. Column short, stout, semiterete, produced at the base into a long narrow foot.

Costa Rica and Panama.

COCLÉ: north rim of El Valle de Antón, near Cerro Turega, 650–700 m., *Woodson & Schery 201a;* mountains beyond La Pintada, 400–600 m., *Hunter & Allen 559;* mossy forest on crest of Cerro Pajita, hills north of El Valle de Antón, 1200 m., *Allen & Allen 4172.*

Possibly a dwarf form of *Maxillaria Reichenheimiana.*

10. MAXILLARIA CAMARIDII Rchb. f. in Hamb. Gartenzeit. 19:547. 1863.

Camaridium ochroleucum Lindl. in Bot. Reg. 10: *t. 844.* 1824, non *Maxillaria ochroleuca* Lodd. ex Lindl.
Cymbidium ochroleucum Lindl., Gen. & Spec. Orch. Pl. 168. 1833.
Ornithidium album Hook. in Bot. Mag. *t. 3306.* 1834, non *Maxillaria alba* (Hook.) Lindl.
Camaridium affine Schltr. in Fedde Rep. Sp. Nov. Beih. 17:72. 1922.

Epiphytic herbs with elongate, complanate-cylindric, pendulous stems, the lower portions with more or less approximate, elliptic, ancipitous, diphyllous pseudobulbs 3–7 cm. long and 1.5–3 cm. wide inserted at an acute angle, those toward the apex produced at more distant intervals; the internodes and the bases of the pseudobulbs enveloped in the persistent, chartaceous, brown, imbricating bases of the obtuse, foliaceous bracts. Leaves subcoriaceous, linear-lanceolate, obtuse, retuse, or unequally 2-lobed at the apex, 15–30 cm. long and 12–18 mm. wide, the conduplicate bases contracted into very short petioles. Inflorescences short 1-flowered scapes 4–5 cm. long, usually produced in successive pairs from the bract axils of the flush of new growth, each plant thus flowering 3 or 4 times during a given season. Flowers very fragrant, relatively large and conspicuous. Sepals subequal, free, widely spreading, somewhat concave, pure white, elliptic-oblanceolate, acute, 2.5–3.5 cm. long and 1.0–1.4 cm. wide, the laterals adnate at the base to the short column foot, forming an inconspicuous rounded mentum. Petals subequal to the sepals, widely spreading, somewhat concave, pure white, elliptic-oblanceolate, acute, 2.2–3 cm. long and 9–10 mm. wide. Lip white on the outer surface, rich yellow within, with reddish brown or reddish purple transverse lines, conspicuously 3-lobed, 10–12 mm. long and 10–12 mm. wide when spread out, contracted at the base and articulated with the foot of the column, the lateral lobes erect, rounded, the anterior margins obtuse to acute, the mid-lobe acute to suborbicular, more or less canaliculate to spreading, ⅖ to ½ the total length of the lip; disk with a linear-lanceolate, concave, yellow callus, ⅔ to ¾ the length of the lateral lobes, the obscurely tridenticulate apex of which is fleshy and glabrous,

the basal ¾ densely and conspicuously papillose. Column semi-terete, somewhat arcuate, 6–8 mm. long, pure white, with a reddish brown or deep purple blotch at the base.

Guatemala, Costa Rica, Panama, Trinidad, British Guiana, Surinam, and probably other adjacent territory.

CANAL ZONE: Río Pedro Miguel, near Paraiso, *Standley 29988.* PANAMÁ: hills east of Panama City, sea level, *Powell 7;* Río Tecúmen, *Standley 29413;* Juan Díaz, sea level, *Cope s. n.;* Cerro Campana, vic. Campana, 2000 ft., *D. Allen 5087;* San José Island, Perlas Archipelago, *Harlow 58, Johnston 206, 1403.* COCLÉ: hills south of El Valle de Antón, 800 m., *Allen 2667.*

A common and attractive species, widely distributed throughout the lowlands of our area. The flowers are produced usually in pairs in several successive flowerings lasting but a single day in each instance. The fragrance is reminiscent of that of Narcissus.

11. MAXILLARIA CHARTACIFOLIA Ames & Schweinf. in Sched. Orch. 10:92. 1930.

Erect, epiphytic herbs without pseudobulbs, the foliage distichously arranged in the form of a fan. Leaves subcoriaceous, linear-lanceolate, acuminate, 8–30 cm. long and 1.0–2.2 cm. wide, the broad, conduplicate, chartaceous bases closely imbricating and persistent. Inflorescences usually about 1–3, slender, 1-flowered scapes 6–9 cm. tall, enveloped in several papery, tubular, acuminate bracts. Flowers relatively small, dull purplish red or reddish brown. Sepals subequal, free, spreading, elliptic-lanceolate, acute, 14–18 mm. long and 5.5–7.3 mm. wide, the laterals somewhat obliquely inserted on the short column foot, forming an inconspicuous, rounded mentum. Petals subequal to the dorsal sepal, elliptic-oblanceolate, acute, 10–13 mm. long and 3.5–5 mm. wide. Lip entire or very obscurely 3-lobed, oblong-ovate, obtuse or subacute, 10–14 mm. long and 2.5–3.5 mm. wide, contracted at the base and articulated with the short column foot, the lateral margins somewhat involute, the apical lobe ovate to oblong-ovate, obtuse to subacute, spreading. Column semi-terete, somewhat arcuate, 6–7.5 mm. long, produced at the base into a short foot.

Costa Rica and Panama.

COCLÉ: vic. El Valle de Antón, 600–1000 m., *Allen 1256, 2074, 4450.*

A curious species, unlike most other Maxillarias, the plants somewhat reminiscent of a *Chondrorhyncha.* The last two collections cited have shorter and narrower leaves and somewhat smaller flowers than those of the type, but otherwise appear to be more nearly referable to this species than to any other.

12. MAXILLARIA CONDUPLICATA (A. & S.) L. Wms. in Ann. Mo. Bot. Gard. 29:348. 1942.

Ornithidium conduplicatum Ames & Schweinf. in Sched. Orch. 8:66, *t. 5.* 1925.

Stout, erect, epiphytic herbs with cylindric, ascending stems apparently often branching and enveloped in 2-ranked foliage; the base of the cane with one or

more stout, ovoid, monophyllous pseudobulbs, in our specimen 5.5 cm. tall and 3.5 cm. wide. Mature leaves absent in our specimen, but apparently large, numerous and ligular, the upper stem covered by the broad, coarse, complanate, 2-ranked, imbricating, persistent bases. Inflorescences short 1-flowered scapes about 2.5 cm. long, produced in dense fascicles from the leaf axils. Flowers small. Sepals subequal, free, apparently not spreading, elliptic-lanceolate, acute, about 6 mm. long and 2–2.5 mm. wide, the laterals somewhat oblique and concave at the base. Petals subequal to the dorsal sepal, elliptic-obovate, acute, about 5 mm. long and 2 mm. wide. Lip canaliculate, with a deep median constriction, more or less subquadrate and 4-lobed when spread out, about 4 mm. long and 2.6 mm. wide, the narrowed base adnate to the base of the column, the lateral lobes rounded, erect in natural position, the mid-lobe suborbicular, conspicuously emarginate at the apex, the lateral concave, rounded lobules erect, the median constriction with a transverse, fleshy callus. Column very short, stout, about 1.75 mm. long.

Fig. 180. *Maxillaria conduplicata*

Panama.

CHIRIQUÍ: Palo Alto Hill, 4000–5000 ft., *Powell 341*.

Known only from the type collection.

13. MAXILLARIA CONFUSA Ames & Schweinf. in Sched. Orch. 8:57. 1925.

Small, erect, epiphytic herbs up to about 25 cm. tall, with clustered, elliptic-oblong, compressed, monophyllous pseudobulbs 12–18 mm. tall and 8–12 mm. wide, the bases enveloped in several imbricating bracts, the upper pair of which is usually foliaceous. Leaves coriaceous, grayish green, ligular to elliptic-lanceolate, acute, 7–16 cm. long and 2–3.5 cm. wide, contracted below into elongate, slender, conduplicate petioles. Inflorescences usually 6–8 slender, 1-flowered scapes 3–4 cm. long, produced from the base of the pseudobulbs. Flowers of moderate size, but large in relation to the size of the plants. Sepals subequal, free, spreading, white, linear-lanceolate, abruptly acute, 17–20 mm. long and 4–5 mm. wide, the oblique bases of the laterals inserted on the elongate column foot, forming a conspicuous acuminate mentum. Petals subequal to the dorsal sepal, white, from an oblique base lanceolate-acuminate, 15–17 mm. long and 4–5 mm. wide. Lip canaliculate, reddish brown, obscurely 3-lobed near the apex, oblong-

obovate, about 12 mm. long and 6 mm. wide when spread out, contracted at the base and articulated with the foot of the column, the lateral margins erect, the apices rounded, mid-lobe ovate, acute, about ¼ the total length of the lip, conspicuously thickened and with a tubercle on the under-surface of the apex; disk with a fleshy linguiform callus, about ⅔ the length of the lateral margins. Column short, stout, semi-terete, somewhat arcuate, produced at the base into a long narrow foot.

Costa Rica and Panama.

VERAGUAS: forested slopes of Cerro Tuté, region west of Santa Fé, 2500 ft., *Allen & Fairchild 4405*.

It seems quite possible that this species, as well as *Maxillaria brevipes* and *M. arachnitiflora*, may prove to be but well-marked varieties of *Maxillaria Reichenheimiana*.

14. MAXILLARIA CRASSIFOLIA (Lindl.) Rchb. f. in Bonplandia 2:16. 1854.

Epidendrum sessile Swartz, Prodr. Veg. Ind. Occ. 122. 1788, non *Maxillaria sessilis* Lindl.
Heterotaxis crassifolia Lindl. in Bot. Reg. 12: *t. 1028*. 1826.
Dicrypta Baueri Lindl. Gen. & Spec. Orch. Pl. 44. 1830.
Dicrypta crassifolia Lindl. ex Loud. Hort. Brit. Suppl. 3:536. 1839.
Maxillaria sessilis Fawcett & Rendle, Fl. Jam. 1:120. 1910, non Lindley.
Maxillaria gatunensis Schltr. in Fedde Rep. Sp. Nov. Beih. 17:68. 1922.

Erect, caespitose, epiphytic herbs averaging about 30 cm. tall. Leaves fleshy, linear-lanceolate, obtuse to acute, 6–35 cm. long and 1–3.8 cm. wide, the conduplicate bases imbricating and forming a short, more or less complanate petiole, sometimes enveloping an inconspicuous, poorly developed, oblong, monophyllous pseudobulb, all but the leaf of the pseudobulb actually being foliaceous bracts. Inflorescences usually short, solitary, 1-flowered scapes, nearly sessile in the upper bract axils. Flowers of moderate size. Sepals subequal, free, spreading, usually yellow or pale yellow, lanceolate, acute, 16–20 mm. long and 5–6 mm. wide, the dorsal sepal somewhat concave, the laterals adnate to the column foot, forming a short, rounded mentum. Petals usually yellow, subequal to the dorsal sepal, linear-lanceolate to oblanceolate, acute, 14–17 mm. long and 3–4 mm. wide. Lip nearly entire or obscurely 3-lobed, yellow with red spots to dark red, concave, 12–14 mm. long and 5–7 mm. wide when spread out, contracted at the base and articulated with the column foot, lateral margins erect, the mid-lobe about ⅓ to ½ the total length of the lip, somewhat thickened and minutely papillose; the disk with a fleshy, thickened keel. Column elongate, semi-terete, somewhat arcuate, 7–9 mm. long, produced at the base into a short foot.

Mexico, Guatemala, British Honduras, Honduras, Costa Rica, Panama, Colombia, Venezuela, Brazil, Florida, Cuba, Jamaica, Hispaniola and probably other adjacent areas.

CANAL ZONE: Gatún Lake, sea level, *Powell 207*. PANAMÁ: San José Island, Perlas Archipelago, *Johnston 273, 1275-A*. CHIRIQUÍ: without definite locality, 4000 ft., *Powell*

118. BOCAS DEL TORO: without definite locality, *von Wedel 477.* DARIÉN: vic. Pinogana, Río Tuira, 20 m., *Allen 917.*

A very common, weedy species widely distributed throughout the lowlands of our area.

15. MAXILLARIA CTENOSTACHYA Rchb. f. in Gard. Chron. 39. 1870.

Maxillaria ctenostachys Rchb. f. ex Schltr. in Beih. Bot. Centralbl. 36^2:495. 1918.
Camaridium arachnites Schltr. in Fedde Rep. Sp. Nov. Beih. 17:73. 1922.
Camaridium stenostachys Schltr. loc. cit. 19:238. 1923.

Elongate, slender, erect or pendulous, epiphytic herbs. Pseudobulbs elliptic, ovoid, complanate, rugose, tapering, diphyllous, those at the base of the plant clustered, 3.5–6.5 cm. tall and 2.5–4 cm. wide, those on the upper branching stem becoming very distant and inserted at an acute angle, 2.5–5 cm. tall and 1.5–2 cm. thick, the bases provided with several elongate, foliaceous bracts; the long internodes closely enveloped in long, acuminate, persistent, papery bracts. Leaves coriaceous, linear-lanceolate, acute, 15–35 cm. long and 1–2.5 cm. wide, contracted below into short conduplicate petioles. Inflorescences usually many short, slender, 1-flowered scapes 1.5–2 cm. long, from the bract axils of the distichous flush of new growth, which at flowering time much resembles the stem of a *Lockhartia* in vegetative appearance. Flowers relatively large, most or all being produced simultaneously, the flowering habit reminiscent of that of *Maxillaria alba*. Sepals subequal, free, more or less spreading, white or pale yellow, lanceolate, long-acuminate, 2.5–4 cm. long and .4–.5 cm. wide; the laterals adnate to the column foot, forming a short, rounded mentum. Petals subequal to the sepals, white or pale yellow, rather obliquely elliptic-lanceolate, long-acuminate, 2–3 cm. long and .3–.5 cm. wide. Lip conspicuously 3-lobed, white or pale yellow, the inner surface with brown or tan markings, 8–12 mm. long and 6–8 mm. wide when spread out, contracted at the base and articulated with the foot of the column, lateral lobes erect in natural position, the anterior margins acute, midlobe ovate, acute, about ½ the total length of the lip, the apex reflexed and somewhat thickened; disk with 5 erect, parallel keels, about ¾ the length of the lateral lobes, the central 3 of which are rounded at the apex and conspicuously thickened. Column semi-terete, somewhat arcuate, 4–6 mm. long, produced at the base into a short foot.

Costa Rica and Panama.

CHIRIQUÍ: Río Caldera, 4500 ft., *Powell 210.*

16. MAXILLARIA CUCULLATA Lindl. in Bot. Reg. 26: *t. 12.* 1840.

Maxillaria meleagris Lindl. loc. cit. 30: Misc. 3. 1844.
Maxillaria Lindeniana Rich. & Gal. in Ann. Sci. Nat. Bot. III, 3:24. 1845.
Maxillaria obscura Linden & Rchb. f. in Rchb. Beitr. Orch. Centr.-Amer. 31. 1866.
Maxillaria puncto-striata Rchb. f. in Linnaea 41:28. 1877.

Erect, epiphytic herbs with clustered, oblong-ovoid to elliptic-ovoid, compressed, rugose, monophyllous pseudobulbs 2.5–4 cm. tall and 1.5–2.5 cm. wide, the bases enveloped in several imbricating, papery bracts. Leaves coriaceous, acute, or retuse and obscurely 2-lobed at the apex, 15–30 cm. long and 1.5–2 cm. wide, contracted below into a conduplicate petiole. Inflorescences usually 3–4 short to elongate, 1-flowered scapes from the base of the pseudobulbs, enveloped in numerous, often spreading, conspicuous, tubular, papery, acuminate bracts. Flowers of moderate size, dark reddish or purplish brown with a maroon lip, or with yellow sepals and petals which may be marked with varying amounts of the darker color. Sepals free, subequal, spreading, lanceolate to elliptic-lanceolate, acute, 1.8–2.2 cm. long and .4–.6 cm. wide, the laterals adnate to the foot of the column, forming a short, subacute mentum. Petals lanceolate, acute, 1.5–1.8 cm. long and .4–.6 cm. wide. Lip conspicuously 3-lobed, 1.4–1.6 cm. long and .6–.8 cm. wide when spread out, contracted at the base and articulated with the foot of the column, the lateral lobes short, conspicuously erect in natural position, the mid-lobe elliptic-lanceolate to elliptic-ovate, acute to subacute, about ⅔ the total length of the lip, the apex thickened, with a fleshy keel on the under-surface; disk with a broad, obtuse, fleshy callus about equaling the lateral lobes in length. Column short, stout, somewhat arcuate, rather dilated at the apex, produced at the base into a foot.

Mexico, Guatemala, Nicaragua, Costa Rica, Panama, and probably adjacent territories.

CHIRIQUÍ: Bajo Chorro, in rain forest, 6000 ft., *Davidson 115;* in woods on Llano del Volcán, 1500 m., *Allen 3504.*

17. MAXILLARIA DENDROBIOIDES (Schltr.) L. Wms. in Ann. Mo. Bot. Gard. 27:283. 1940.

Camaridium dendrobioides Schltr. in Beih. Bot. Centralbl. 36^2:415. 1918.
Camaridium Jimenezii Schltr. loc. cit. 416. 1918.
Camaridium simile Schltr. in Fedde Rep. Sp. Nov. Beih. 19:239. 1923.

Slender, erect or pendulous, epiphytic herbs without pseudobulbs, 30–45 cm. tall, the stems usually branching, the lower portions enveloped in the closely imbricating, papery leaf bases; the foliage of the apex 2-ranked. Leaves spreading, coriaceous, ligular, the apices usually retuse or rather unequally 2-lobed, very variable in size, 1–6 cm. long and .25–1.0 cm. wide (in our specimens 1.5–2 cm. long and about .3 cm. wide), the conduplicate bases closely imbricating and persistent, enveloping the stems. Inflorescences short, slender, 1-flowered scapes 10–15 mm. long, produced from the leaf axils. Flowers small. Sepals free, subequal, apparently not spreading, lanceolate, acute or obtuse, 9–11 mm. long and 2–2.5 mm. wide, the laterals somewhat obliquely inserted on the column foot, forming a short, rounded mentum. Petals subequal to the dorsal sepal, rather obliquely elliptic-oblanceolate, obtuse or shortly acute, 7–8.5 mm. long and 2–2.5 mm. wide. Lip obscurely 3-lobed, about 7.5 mm. long and 3.5 mm. wide when

spread out, contracted at the base and articulated with the column foot, the lateral lobules or margins rounded, erect in natural position, the mid-lobe ovate to ligular, obtuse, about ½ the total length of the lip; disk with 3 parallel, thickened nerves, about ½ the length of the lateral margins. Column semi-terete, about 3.5 mm. long, produced at the base into a short foot.

Costa Rica and Panama.

CHIRIQUÍ: vic. Bajo Chorro, in heavy rain forest, 6000 ft., *Davidson 240.*

18. MAXILLARIA DIUTURNA Ames & Schweinf. in Sched. Orch. 8:58. 1925.

Erect or pendent, epiphytic herbs with elliptic-oblong to elliptic-ovate, strongly ancipitous, monophyllous pseudobulbs 2–3 cm. long and .1–.2 cm. wide, rather distant and inserted at an acute angle on the stems; the internodes and bases of the pseudobulbs enveloped in closely imbricating, persistent bracts the upper pair of which is foliaceous. Leaves persistent, coriaceous, ligular to elliptic-lanceolate, acute or minutely and unequally 2-lobed, 6–15 cm. long and 1.2–3 cm. wide, contracted below into short, conduplicate petioles. Inflorescences short, slender, 1-flowered scapes, apparently produced singly in succession from the bract axils of the flush of new growth. Flowers pseudo-campanulate, of moderate size. Sepals subequal, free, not spreading, bright yellow or sometimes reddish yellow on the outer surfaces, 12–14 mm. long and 5–6 mm. wide, ovate-lanceolate, acute, concave, with a low central keel, the laterals adnate to the column foot forming a prominent, rounded mentum. Petals elliptic-ovate, acute, bright yellow, 10–12 mm. long and 6–7 mm. wide. Lip entire, bright yellow with scarlet markings, oblong-pandurate, 10–12 mm. long and 5–6 mm. wide when spread out, somewhat contracted at the base and articulated with the column foot, lateral margins somewhat erect in natural position, the apex truncate, obscurely emarginate and 2-lobed, the lobules somewhat erect in natural position; the disk with a linear to oblong, obtuse, fleshy callus. Column semi-terete, somewhat arcuate, 5–6 mm. long, produced at the base into a foot.

Costa Rica and Panama.

PANAMÁ: cloud forest on the summit of Cerro Campana, 3000 ft., *Allen 5183.* COLÓN: Cativo-Porto Bello trail, sea level, *Powell 376.* COCLÉ: vic. La Mesa, region north of El Valle de Antón, 1000 m., *Allen 2306, 2935.*

19. MAXILLARIA EXALTATA (Kränzl.) C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 11:272. 1945.

Camaridium exaltatum Kränzl. in Engler's Bot. Jahrb. 37:386. 1906.

Tall, erect, epiphytic herbs, the cylindric, sometimes branching stems 60–75 cm. tall, apparently entirely without pseudobulbs, the lower portions enveloped in the closely imbricating, persistent, chartaceous leaf bases which ultimately weather to loose fibers, the upper stem with 2-ranked foliage. Leaves coriaceous, linear-lanceolate, acuminate, 9–25 cm. long and .8–1.5 cm. wide, the broad, conduplicate bases imbricating and equidistantly distributed on the stem. Inflores-

cences usually several, slender, 1-flowered scapes 5–6 cm. long, produced from the upper leaf axils. Flowers of moderate size. Sepals free, subequal, spreading, pale pinkish tan (in our specimens), the dorsal sepal linear-lanceolate, acute, with a central keel, 2–2.5 cm. long and .35–5 cm. wide, the laterals ligular, acute, 2.3–2.8 cm. long and .5–.7 cm. wide, the bases rather oblique and adnate to the column foot, forming a prominent acute mentum. Petals linear-lanceolate, acute, pale pinkish tan (in our specimens), 2–2.2 cm. long and .3–.4 cm. wide. Lip 3-lobed near the apex, reddish-brown, 13–15 mm. long and 6–8 mm. wide when spread out, contracted at the base and articulated with the column foot, lateral lobes erect in natural position, the anterior margins subacute and somewhat projecting, the mid-lobe ovate, abruptly acute, about ¼ the total length of the lip, conspicuously thickened and minutely papillose, with a prominent tubercle on the underside of the apex; the disk with a ligular, rather concave, obtuse callus, about ¾ the length of the lateral lobes, the apex rather conspicuously thickened. Column short, stout, semi-terete, produced at the base into a long foot.

Panama and Peru.

COCLÉ: mossy forest on the crest of Cerro Pajita, hills north of El Valle de Antón, 1200 m., *Allen & Fairchild 3945*.

This collection represents a tremendous extension of range for this rather poorly known Peruvian species. Our specimens match the excellent photograph of the type and the type description in the Ames Herbarium almost exactly, even to the size of the floral parts, which is remarkable in view of the wide separation of the areas of collection. It is of course to be expected that the species also exists in Colombia and Ecuador, and will eventually be collected there.

20. MAXILLARIA FRIEDRICHSTHALII Rchb. f. in Bot. Zeit. 10:858. 1852.

Maxillaria aciantha Rchb. f. loc. cit. 1852.
Lycaste aciantha Rchb. f. in Bonplandia 3:216. 1855.
Maxillaria turialbae Schltr. in Beih. Bot. Centralbl. 36^2:414. 1918.
Maxillaria rhodosticta Kränzl. in Fedde Rep. Sp. Nov. 24:223. 1928.

Erect or semi-pendent, epiphytic herbs with complanate, elliptic-oblong, rugose pseudobulbs 1.5–5 cm. tall and 7–15 mm. wide, approximate and inserted at an acute angle on the usually arching rhizome; the short internodes and bases of the pseudobulbs enveloped in the persistent, chartaceous bases of the closely imbricating bracts, the upper pair of which is usually foliaceous. Leaves coriaceous, 2–3 (very rarely 1 or 4) from the apex of the pseudobulbs, ligular, the apex obscurely and unequally 2-lobed, 3.5–18 cm. long and .7–1.5 cm. wide, contracted below into very short, conduplicate petioles. Inflorescences 1 to several, often loosely fasciculate, 1-flowered scapes 1.8–4 cm. long, produced from the base of the mature pseudobulb, the peduncles closely enveloped in numerous broad, acute, imbricating, chartaceous bracts. Flowers small to relatively large, the size apparently correlated with the size of the plant. Sepals subequal, free, not spread-

ing, linear-lanceolate, acute to acuminate, 1.5–3 cm. long and .3–.6 cm. wide, greenish yellow to greenish lavender, the laterals adnate to the column foot, form-

Fig. 181. *Maxillaria Friedrichsthalii*

ing a short, acute mentum. Petals lanceolate to linear-lanceolate, acute to acuminate, greenish yellow, 1.2–2.5 cm. long and .2–.3 cm. wide. Lip entire, linear-oblanceolate, obtuse to subacute, canaliculate, 1.2–2.5 cm. long and .3–.6 cm. wide, usually pale yellowish green, the long narrow base articulated with the foot of the column, the lateral margins somewhat erect, the apex conspicuously thickened, usually dark maroon to nearly black; the disk with a rather obscure, yellow central keel, which extends from the base about $\frac{2}{5}$ the total length of the lip. Column elongate, semi-terete, somewhat arcuate, 8–20 mm. long, produced at the base into a short foot.

Mexico, British Honduras, Guatemala, Honduras, Nicaragua, Costa Rica, Panama, and probably adjacent South America.

CANAL ZONE: Barro Colorado Island, *Shattuck 543*. PANAMÁ: vic. Paja, sea level, *Powell 3210;* Cerro Campana, vic. Campana, 800 m., *Allen 4025*. COCLÉ: vic. El Valle de Antón, 600–1100 m., *Allen 1254, 1257, 3992;* Bismarck, 2000–3000 ft., *Williams 444*. CHIRIQUÍ: without definite locality, 4000–5000 ft., *Powell 3516;* Bajo Mono, 4500 ft., *Davidson 524*.

A very common species, widely distributed throughout the lowlands and intermediate highlands of our area.

21. MAXILLARIA FULGENS (Rchb. f.) L. Wms. in Ann. Mo. Bot. Gard. 28:425. 1941.

Ornithidium fulgens Rchb. f. Beitr. Orch. Centr.-Amer. 76. 1866.

Erect, epiphytic herbs 40–75 cm. tall, with elongate, often branching, cylindric, woody canes usually arising from a basal cluster of a few stout, ovoid, fleshy pseudobulbs 3.5–4 cm. tall and 2–3 cm. wide; the long internodes or basal portions of the stems closely enveloped in the persistent, imbricating leaf bases, or becoming naked after these have weathered away; the apex of the cane with 2-ranked foliage. Leaves coriaceous, linear-lanceolate, acute, 12–38 cm. long and 1.5–3 cm. wide, forming a compact, distichous fascicle at the apex of the stems, portions of which are often still in evidence at the earlier nodes along the more elongate canes, the conduplicate leaf bases sometimes enveloping a small, poorly developed pseudobulb. Inflorescences usually about 15–30 slender, 1-flowered scapes, 1.5–3 cm. tall, in dense subsessile fascicles from the lower leaf axils. Sepals rather fleshy, subequal, free, not spreading, broadly ovate, acute, concave, reddish orange, 7–8 mm. long and 3–3.5 mm. wide, the laterals adnate to the somewhat produced base of the column, forming a short, rounded mentum. Petals lanceolate, acute, 5–6 mm. long and about 2.5 mm. wide, suffused reddish orange shading to yellow at the base. Lip entire, bright yellow or orange, 4–4.5 mm. long and 1.5–2 mm. wide, geniculate and more or less sigmoid in profile, the orbicular basal half deeply concave or subsaccate, adnate to the base of the column, the strongly reflexed apical half elliptic-oblong, obtuse, rather fleshy, with thin, erect, often somewhat undulant margins, the apex becoming rather shallowly emarginate, with a short, acute, fleshy, carinate projection on the under-surface. Column semiterete, somewhat arcuate, bright yellow, 2.5–3 mm. long, the base without a foot.

Costa Rica and Panama.

COCLÉ: region north of El Valle de Antón, vic. La Mesa and La Loma del Tigre, about 3000 ft., *Allen 2256, 2388, 3779*. CHIRIQUÍ: Caramilla, 5000 ft., *Powell 283*.

A frequent, attractive species of the wet highland forests of Coclé and Chiriquí provinces.

22. MAXILLARIA INAUDITA Rchb. f. Beitr. Orch. Centr.-Amer. 76. 1866.

Robust, erect or pendulous, epiphytic herbs 45–60 cm. tall, the elongate

cylindric canes provided with distichous, spreading foliage at the apex, the basal portions enveloped in the broad, complanate, persistent, imbricating leaf bases; the plants seemingly without pseudobulbs but sometimes with 1 or more elliptic-oblong, strongly ancipitous, monophyllous pseudobulbs up to 8 cm. tall and 4.5 cm. wide at the base of the leafy cane. Leaves coriaceous, ligular to elliptic-lanceolate, broadly obtuse, 15–25 cm. long and 3.5–4.5 cm. wide, contracted at the base into narrow conduplicate petioles, the broader rugose bases persistent and equidistantly distributed on the stems. Inflorescences short 1-flowered scapes 4–5 cm. long, produced from the axils of the leaves. Flowers relatively large and conspicuous. Sepals subequal, free, spreading, lanceolate, acuminate, white, 2.5–4 cm. long and 6–8 mm. wide, the laterals adnate to the column foot, forming an inconspicuous, rounded mentum. Petals lanceolate, acuminate, white, 2.2–3 cm. long and .4–.5 cm. wide. Lip rather obscurely 3-lobed, ovate, obtuse to subacute when spread out, 1.5 cm. long and 1 cm. wide, contracted at the base into a short claw which is articulated with the foot of the column, the lateral lobes white, erect in natural position, the mid-lobe ovate, obtuse to subacute, yellow, about ⅓ the total length of the lip, separated from the lateral lobes by plicate folds; the disk with a concave, ligular, obtuse callus which is about ¾ the length of the lateral lobes. Column semi-terete, somewhat arcuate, 6–8 mm. long, produced at the base into a short foot.

Costa Rica and Panama.

VERAGUAS: forested slopes of Cerro Tuté, region west of Santa Fé, 3000 ft., *Allen & Fairchild 4338.*

23. MAXILLARIA LONGIPETIOLATA Ames & Schweinf. in Sched. Orch. 8:61. 1925.

Erect, epiphytic herbs about 23 cm. tall, with elliptic-ovoid, compressed, somewhat finely wrinkled monophyllous pseudobulbs 2.5 cm. tall and 1.5 cm. wide, which apparently are approximate on an abbreviated rhizome, the bases enveloped in several papery bracts which become fibrous with age. Leaves subcoriaceous, linear-lanceolate, acuminate, 16 cm. long and 2 cm. wide, contracted below into an elongate, slender, conduplicate petiole. Inflorescences apparently short, solitary, 1-flowered scapes from the base of the pseudobulbs. Flowers of moderate size. Sepals subequal, free, spreading, oblong-lanceolate, acute, Indian red, 16–18 mm. long and 5.5–5.8 mm. wide. Petals subequal to the dorsal sepal, Indian red, linear-lanceolate, rather obliquely acute, 1.5–2.5 cm. long and about 3 mm. wide. Lip conspicuously 3-lobed, dark maroon, about 1.4 cm. long and .8 cm. wide when spread out, contracted at the base and articulated with the foot of the column, the lateral lobes erect in natural position, the acute apices spreading, the mid-lobe ligular, about ½ the total length of the lip, the rounded apex lightly retuse; the disk with a linear-lanceolate callus about ⅔ the length of the lateral lobes, the obtuse apex rather fleshy. Column semi-terete, somewhat arcuate, about 7 mm. long, produced at the base into a short foot. Anther yellow.

Fig. 182. *Maxillaria luteo-alba*

Panama.

PANAMÁ: hills east of Corozal, sea level, *Powell 307*.

Known only from the type collection.

24. MAXILLARIA LUTEO-ALBA Lindl. Orch. Linden. 20. 1846.

Maxillaria luteo-grandiflora Hort. in Flor. Mag. 10: *t. 559*. 1871.

Erect, epiphytic herbs with stout, oblong-ovoid to elliptic-ovoid, somewhat compressed, monophyllous pseudobulbs 3–5 cm. tall and 2–3 cm. wide, the bases enveloped in several long, papery, imbricating bracts which become fibrous with age. Leaves coriaceous, linear-lanceolate to elliptic-lanceolate, acute, 25–50 cm. long and 2.5–4 cm. wide, contracted below into short or elongate, conduplicate petioles. Inflorescences usually about 3 erect, 1-flowered scapes 9–14 cm. long, produced from the bases of the pseudobulbs, enveloped in several papery, acute, tubular bracts. Flowers conspicuous, the largest of the genus in Panama. Sepals subequal, free, widely spreading, ligular, broadly obtuse, white on the outer surfaces and pale yellow within, 4–5 cm. long and 1.0–1.2 cm. wide, the laterals adnate to the column foot, forming a prominent, acute mentum. Petals ligular, shortly subacute, the apices incurving in natural position, white without and pale yellow within, 3.5–4 cm. long and .5–.7 cm. wide. Lip conspicuously 3-lobed, deep yellow, margined white, about 2.5 cm. long and 1.8 cm. wide when spread out, contracted at the base and articulated with the foot of the column, the lateral lobes erect in natural position, the rounded apices somewhat projecting, mid-lobe ovate, obtuse, about ⅓ the total length of the lip; the disk with a linguiform, laterally bicarinate, acute callus, about ⅔ the length of the lateral lobes. Column semi-terete, somewhat arcuate, about equaling the length of the lateral lobes of the lip.

Costa Rica, Panama, Colombia, and Ecuador.

COCLÉ: hills north of El Valle de Antón, crest of Cerro Pajita and La Loma del Tigre, 3000–3200 ft., *Allen 2870, 3817, 4192*.

A common, large-flowered, attractive species of the high rainy hills north of El Valle, and to be expected in other similar situations throughout our range.

25. MAXILLARIA MALEOLENS Schltr. in Fedde Rep. Sp. Nov. Beih. 19:233. 1923.

Erect, epiphytic herbs 30–45 cm. tall, with approximate or solitary, strongly ancipitous, monophyllous, oblong-elliptic pseudobulbs 4.5–8 cm. tall and 2–3.5 cm. wide, the bases enveloped in 3–4 complanate, imbricating, foliaceous bracts. Leaves coriaceous, ligular, broadly obtuse, 15–45 cm. long and 2.5–5 cm. wide, contracted below into conduplicate petioles, the complanate-conduplicate bases distichously arranged in the form of an open fan. Inflorescences usually solitary, 1-flowered scapes 5–8 cm. long, produced from the upper bract axils. Flowers of moderate size, fragrant. Sepals subequal, free, spreading, yellow, elliptic-lanceolate, acute, 2–2.5 cm. long and .8–1.0 wide, the laterals rather obliquely

inserted on the column foot, forming a short, rounded mentum. Petals yellow, ligular, the apices obliquely acute, 18–20 mm. long and 4–5 mm. wide. Lip rather obscurely 3-lobed, reddish brown to rich purple throughout, or sometimes with the lateral lobes yellow, 2–2.3 cm. long and 1–1.2 cm. wide when spread out, contracted at the base and articulated with the foot of the column, the lateral lobes or margins rounded, erect in natural position, the mid-lobe ovate, obtuse, rather fleshy, about ⅓ the total length of the lip, reflexed at the apex; the disk with a narrow, thickened, central nerve, about equaling the lateral lobes in length. Column semi-terete, somewhat arcuate, 12–15 mm. long, produced at the base into a foot.

Honduras, Costa Rica, and Panama.

CANAL ZONE: Gatún Lake, sea level, *Powell 276*. COCLÉ: region north of El Valle de Antón, 3000 ft., *Fairchild s. n.* (under *Allen 2932*).

26. MAXILLARIA MINOR (Schltr.) L. Wms. in Amer. Orch. Soc. Bull. 10:273. 1942.

Camaridium minus Schltr. in Beih. Bot. Centralbl. 36^2:417. 1918.

Erect, epiphytic herbs with slender, branching stems provided with small, very distant, suborbicular, monophyllous, compressed pseudobulbs 6–15 mm. long and 6–15 mm. wide, the bases covered by 2–3 conspicuous, foliaceous bracts, the long internodes very closely enveloped in complanate, imbricating, acuminate, papery sheaths. Leaves subcoriaceous, lanceolate to elliptic-lanceolate, acute, 3.5–15 cm. long and 1–2 cm. wide, contracted below into slender, conduplicate petioles. Inflorescences several very short, 1-flowered scapes 5–10 mm. long, apparently produced simultaneously from the bract axils of the flush of new growth. Flowers very small, often enveloped in 2 glumaceous bracts. Sepals subequal, free, not spreading, concave, oblong-lanceolate, acute to subacute, about 4 mm. long and 2 mm. wide, the laterals adnate to the base of the column, forming a rounded, conspicuous mentum. Petals subequal to the dorsal sepal, ligular, obtuse, about 3 mm. long and 1.5 mm. wide. Lip fleshy, 3-lobed, about 3 mm. long, articulated with the base of the column, the lateral lobes rounded, erect, on either side of a basal concavity which has a short, ligular, fleshy callus, the mid-lobe ovate, subacute, nearly ½ the total length of the lip, the basal constriction below the lateral lobes with a transverse, semicircular thickening. Column short, stout, the lateral margins thickened toward the obscurely produced base.

Costa Rica and Panama.

COCLÉ: mossy forest on summit of Cerro Pajita, hills north of El Valle de Antón, 1100 m., *Allen 3991*.

27. MAXILLARIA NEGLECTA (Schltr.) L. Wms. in Ann. Mo. Bot. Gard. 29:348. 1942.

Ornithidium anceps Rchb. f. Beitr. Orch. Centr.-Amer. 75. 1866, non *Maxillaria anceps* A. & S.

Ornithidium neglectum Schltr. in Fedde Rep. Sp. Nov. Beih. 19:242. 1923.

Fig. 183. *Maxillaria neglecta*

Erect or pendulous, epiphytic herbs, of very variable vegetative habit, usually with elongate, often branching rhizomes. Pseudobulbs monophyllous, ligular to suborbicular, strongly ancipitous to very thick and fleshy, 1.5–4.5 cm. long and .5–1.5 cm. wide, approximate to very distant, inserted at an acute angle on the stems, the long cylindric internodes and the bases enveloped in closely imbricating, papery bracts. Leaves subcoriaceous, ligular, acute, 6–18 cm. long and 1.2–2.5 cm. wide, the bases contracted into very short conduplicate petioles. Inflorescences very short, 1–flowered scapes, produced in dense subsessile fascicles from the bases of the mature pseudobulbs. Flowers small, usually enveloped in 2 glumaceous bracts. Sepals free, apparently not spreading, concave, yellow or white, about 6 mm. long, the dorsal sepal elliptic-ovate, acute, the laterals broadly rhombic with oblique, acute apices, the oblique bases forming an acute or rounded, conspicuous mentum. Petals subequal to the dorsal sepal, oblong-ligular, subacute, about 4.5 mm. long, similarly colored with the sepals. Lip yellow, about 6 mm. long and 3 mm. wide when spread out, geniculate in profile, the long narrow base continuous with the base of the column, the limb dilated and conspicuously 3-lobed near the apex, the obliquely triangular lateral lobes erect, joined below the apices by a narrow transverse callus, the mid-lobe rather fleshy, triangular to broadly ovate, acute to obtuse, inserted at an abruptly deflexed angle below the apices of the lateral lobes. Column short, about 1.7 mm. long, the base continuous with the claw of the lip.

Honduras, Nicaragua, Costa Rica, and Panama.

CANAL ZONE: hills north of Frijoles, *Standley 27669*. PANAMÁ: hills east of Panama City, sea level, *Powell 324*. COLÓN: Río Pequení, upper Madden Lake region, 200 ft., *Fairchild s. n.*; Cerro Santa Rita, 1200 ft., *Allen & Fairchild 5191*. COCLÉ: vic. El Valle de Antón, 800–1000 m., *Allen 780*. CHIRIQUÍ: upper Río Chiriquí Viejo, 1300–1900 m., *White & White 37*; vic. Finca Lérida, eastern slopes of Chiriquí Volcano, 5000 ft., *R. K. Morris s. n.*; vic. Bajo Mono and Quebrada Chiquero, 1500 m., *Woodson & Schery 563*; Bajo Mono-Robalo trail, western slopes of Cerro Horqueta, 5000–7000 ft., *Allen 4783*.

A common species of very variable vegetative habit, widely distributed throughout our area.

28. MAXILLARIA OREOCHARIS Schltr. in Fedde Rep. Sp. Nov. Beih. 17:69. 1922.

Erect or pendulous, epiphytic herbs. Pseudobulbs strongly ancipitous, oblong-elliptic, monophyllous, 3–4 cm. long and 1.0–1.5 cm. wide, approximate and often more or less imbricating, obliquely inserted on the rhizome, the bases provided with several imbricating bracts, the upper 1–3 of which are conspicuously long-foliaceous, the short internodes enveloped in closely imbricating, more or less complanate, persistent, acute, papery bracts. Leaves subcoriaceous, linear, acute or acuminate, 25–40 cm. long and .6–1.0 cm. wide, contracted below into very short, conduplicate petioles. Inflorescences usually solitary, slender, 1-flowered scapes 3–4 cm. long, produced from the base of the mature pseudobulbs. Sepals subequal, free, more or less spreading, lanceolate, acute, white with red markings,

about 1.5 cm. long and .3–.4 cm. wide, the laterals adnate to the column foot, forming an inconspicuous, subacute mentum. Petals subequal to the dorsal sepal, lanceolate, acute, white, about 12 mm. long and 2.5–3 mm. wide. Lip oblong-ligular, acute, 3-lobed near the apex, about 12 mm. long and 5 mm. wide when spread out, the base articulated with the foot of the column, the lateral lobes erect in natural position, dark red, the mid-lobe ovate, subacute, somewhat thickened, about ⅓ the total length of the lip, yellow, the upper surface and margins minutely papillose-puberulent; the disk with a linear, obtuse, fleshy callus, about ¾ the length of the lateral lobes. Column slender, semi-terete, somewhat arcuate, the apex dilated, about 7 mm. long, white, the base produced into a foot.

Costa Rica and Panama.

CHIRIQUÍ: without definite locality, 4000–5000 ft., *Powell 256.*

29. MAXILLARIA PARVILABIA Ames & Schweinf. in Sched. Orch. 8:62. 1925.

Erect, epiphytic herbs without pseudobulbs; the woody, often branching, cylindric canes 1–1.25 m. tall, the lower portions closely enveloped in the persistent leaf bases, the apices with 2-ranked foliage. Leaves coriaceous, linear-lanceolate, obtuse or retuse and obliquely 2-lobed at the apex, 4–15 cm. long and .6–1.2 cm. wide, the tubular, clasping bases closely imbricating and equidistantly distributed on the stems. Inflorescences few to many slender, 1-flowered scapes about 4 cm. long, produced singly or in loose fascicles from the leaf axils. Flowers pale yellow, of moderate size. Sepals subequal, free, spreading, lanceolate, acute, 1.6–2 cm. long and .4–.5 cm. wide, the laterals adnate to the foot of the column, forming a short, subacute mentum. Petals subequal to the dorsal sepal, elliptic-lanceolate, acute, 1.3–1.5 cm. long and .4–.5 cm. wide. Lip small, obscurely 3-lobed, elliptic-obovate, 5–6 mm. long and 3–3.5 mm. wide when spread out, contracted at the base and articulated with the foot of the column, the lateral margins somewhat erect in natural position, distinct only at the small acute apices, mid-lobe fleshy, ovate, acute, about ⅖ the total length of the lip, the apex lightly recurved; the disk with a small fleshy linguiform callus, about ½ the length of the lateral lobes. Column short, stout, semi-terete, about 2.5 mm. long, produced at the base into a short foot.

Costa Rica and Panama.

CHIRIQUÍ: vic. Bajo Chorro, in rain forest, headwaters of the Río Caldera, 6000 ft., *Davidson 126.*

30. MAXILLARIA PITTIERI (Ames) L. Wms. in Ann. Mo. Bot. Gard. 29:349. 1942.

Ornithidium Pittieri Ames, in Sched. Orch. 2:35. 1923.

Erect or pendulous, epiphytic herbs with woody, branching, cylindric canes up to about 1.5 m. tall, the lower portions naked or enveloped in the persistent, tubular leaf bases, the apex with sparse clusters of 2-ranked foliage, portions of which may persist at distant intervals along the stems. Leaves coriaceous, ligular, acute, 7–15 cm. long and 1–2 cm. wide, the conduplicate bases forming a sheathing

Fig. 184. *Maxillaria planicola*

petiole. Inflorescences short 1-flowered scapes, produced in dense fascicles from the axils of the leaves. Flowers small, pink. Sepals free, subequal, not spreading, concave, ovate, acute, with a central keel, 8–9 mm. long and about 4 mm. wide, the laterals adnate to the somewhat produced base of the column, forming a short, rounded mentum. Petals subequal to the dorsal sepal, concave, oblong-ovate, acute, 7 mm. long and about 3 mm. wide. Lip fleshy, entire, about 4 mm. long and 2.5 mm. wide, the base deeply concave and adnate to the base of the column, the apex lanceolate, obtuse to subacute, conspicuously thickened. Column short, stout, about 2.5 mm. long, the base with conspicuous lateral thickenings.

Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, in rain forest, headwaters of the Río Caldera, 6000 ft., *Davidson 117*.

31. MAXILLARIA PLANICOLA C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 8:188. 1940.

Camaridium latifolium Schltr. in Fedde, Rep. Sp. Nov. Beih. 17:74. 1922, non *Maxillaria latifolia* Lindl.

Epiphytic herbs with elliptic-ovate to elliptic-oblong, compressed, monophyllous pseudobulbs 3.5–6 cm. long and 1.5–4 cm. wide, the internodes of the mature plants 6–8 cm. long and 8–12 mm. thick, enveloped in closely imbricating, tubular, acute, papery bracts, the upper 3–6 of which are complanate-spathaceous, the conduplicate bases covering the lower half of the pseudobulb. Leaves coriaceous, ligular to elliptic-lanceolate, acute, 15–35 cm. long and 3–6 cm. wide, contracted below into narrow, conduplicate petioles. Inflorescences usually 2–4 slender 1-flowered scapes, 4–5 cm. long, produced from the axils of the spathaceous, sheathing bracts after the current pseudobulb has nearly matured. Flowers relatively large and conspicuous. Sepals subequal, free, not spreading, concave, the dorsal sepal lanceolate, acute, 3–3.5 cm. long and .8–1.0 cm. wide, the laterals elliptic-lanceolate, acute, 3–3.5 cm. long and 1.0–1.2 cm. wide, adnate to the foot of the column, forming an inconspicuous, rounded mentum. Petals white, lanceolate, acute, 2.8–3.2 cm. long and .6–.7 cm. wide. Lip conspicuously 3-lobed, white, 18–20 mm. long and 18–20 mm. wide when spread out, contracted at the base and articulated with the foot of the column, the lateral lobes erect and incurving over the column in natural position, the acute apices projecting, the mid-lobe triangular, acute, about $\frac{1}{3}$ the total length of the lip; the disk with a short, fleshy, ligular, obtuse callus about $\frac{3}{4}$ the length of the lateral lobes, the basal half yellow, densely and conspicuously pilose. Column semi-terete, somewhat arcuate, 10–12 mm. long, produced at the base into a short foot.

Panama.

CANAL ZONE: vic. San Juan de Pequení, upper Madden Lake region, *Powell 3438*; vic. Vigía and San Juan de Pequení, 66 m., *Dodge, Steyermark & Allen 16580*. PANAMÁ: hills east of Panama City, *Powell 8*; Cerro Campana, vic. Campana, on sheer rock face, 2500 ft., *Allen 5078*. COLÓN: vic. Porto Bello, sea level, *Powell 3458*.

32. MAXILLARIA POWELLII Schltr. in Fedde Rep. Sp. Nov. Beih. 17:70. 1922.

Erect, epiphytic herbs with approximate, fleshy, ovoid to elliptic-ovoid, compressed, monophyllous pseudobulbs 2–4 cm. long and 1.5–2 cm. wide, the bases enveloped in several papery, imbricating bracts which often weather away to loose fibers. Leaves coriaceous, ligular, obtuse to subacute, 15–40 cm. long and 2–3 cm. wide, contracted below into slender, conduplicate petioles. Inflorescences usually 2–4 slender, 1-flowered scapes 4–6 cm. long, produced from the bases of the pseudobulbs. Flowers of moderate size. Sepals subequal, free, spreading, yellow or tan, the dorsal sepal concave, 1.5–1.8 cm. long and .4–.6 cm. wide, ligular to elliptic-lanceolate, obtuse, with a minute apicule, the laterals ligular to elliptic-lanceolate, obtuse, 1.8–2 cm. long and .4–.8 cm. wide, the oblique bases adnate to the foot of the column forming a short, subacute mentum. Petals subequal to the dorsal sepal, yellow or tan, rather obliquely ligular, acute, 1.5–1.7 cm. long and .4–.5 cm. wide. Lip conspicuously 3-lobed near the apex, 1.4–1.6 cm. long and .7–.8 cm. wide when spread out, contracted at the base and articulated with the foot of the column, the lateral lobes yellow or tan, erect in natural position, the acute to obtuse apices projecting, the mid-lobe ovate, acute, fleshy, rugulose, minutely pilose, usually reddish brown, about ⅓ the total length of the lip, the under-surface of the apex with a triangular keel; the disk with a low, ligular callus about ¾ the length of the lateral lobes. Column semi-terete, somewhat arcuate, 7–8 mm. long, produced at the base into a foot. Anther terminal, operculate, incumbent, 1-celled.

Panama.

CANAL ZONE: vic. Frijoles, Gatún Lake, sea level, *Powell 28*. PANAMÁ: Cerro Campana, 2400 ft., *Allen & Fairchild 3973, 4235, 4237*. COCLÉ: vic. El Valle de Antón, 600 m., *Allen 2073*; mossy forest on the crest of Cerro Pajita, hills north of El Valle, 1200 m., *Allen 4254*.

A common small-flowered species, rather doubtfully distinct from *Maxillaria ringens*.

33. MAXILLARIA REPENS L. Wms. in Amer. Orch. Soc. Bull. 10:273, *t. 9*. 1942.

Repent, epiphytic herbs with elongate, slender, often branching stems enveloped in tubular, papery sheaths which often weather away, the caespitose 2-ranked foliaceous growths usually freely rooting from the base, distant or terminal on the stems. Leaves 3–5, coriaceous, 3–10 cm. long and 1–2 cm. wide, elliptic-lanceolate, acute, the conduplicate bases closely imbricating, forming a complanate, sheathing petiole. Inflorescences usually several slender, 1-flowered scapes 1.5–2 cm. long, produced from the axils of the leaves. Flowers small. Sepals subequal, green with reddish brown margins, lanceolate, acute, 7–10 mm. long and 2.5–3.5 mm. wide, the dorsal sepal concave and incurving over the column, the laterals adnate to the foot of the column, widely spreading or reflexed. Petals subequal to and parallel with the dorsal sepal, green with reddish brown margins, linear-lanceolate, acute, 6.5–7.5 mm. long and 2–3 mm. wide. Lip conspicuously 3-

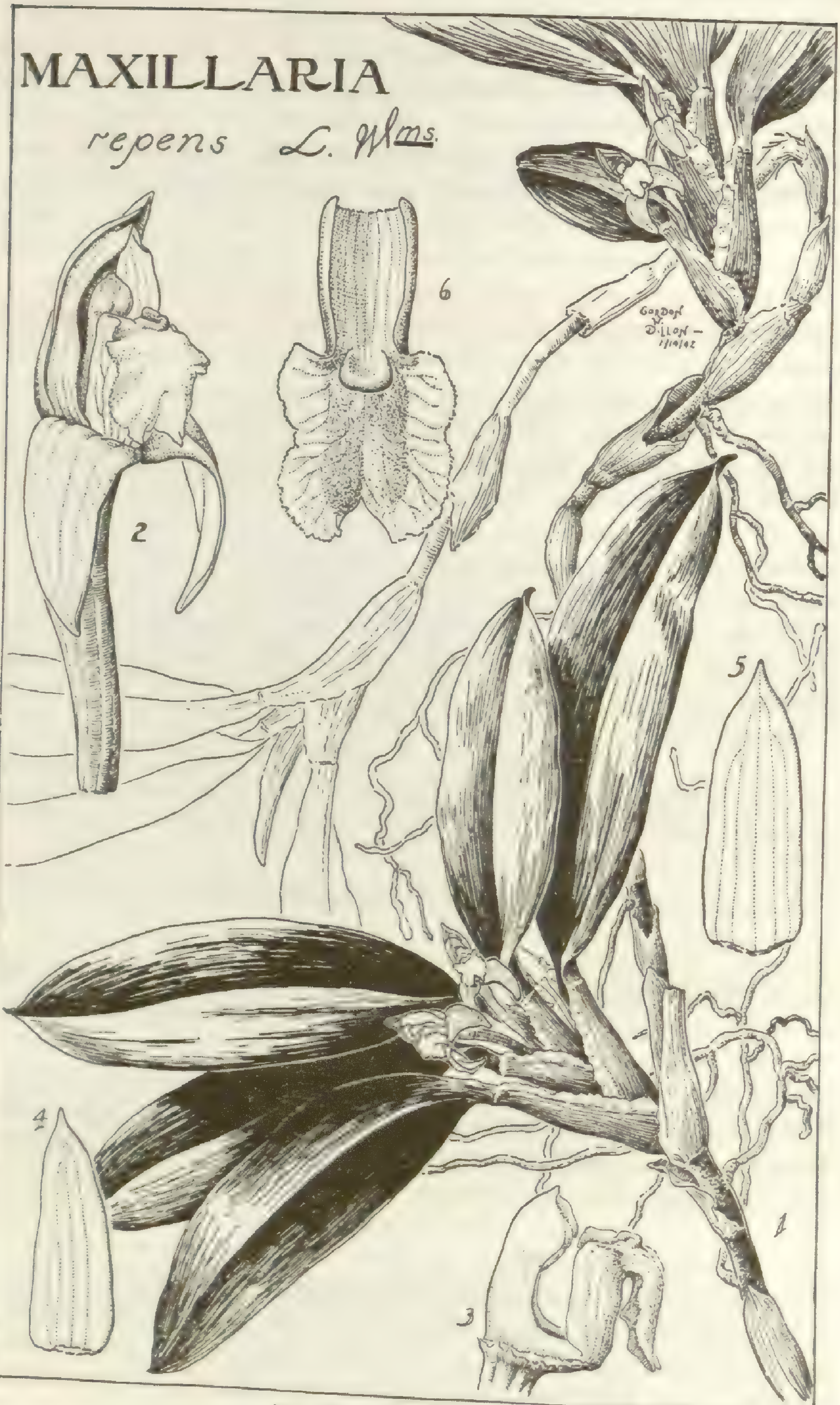


Fig. 185. *Maxillaria repens*

lobed, 6–8 mm. long and 3.5–4.5 mm. wide, the basal half canaliculate and adnate to the foot of the column, the lateral lobes erect and parallel with the column, the area between the truncate apices with a short, obtuse, concave, fleshy callus; the mid-lobe broadly spreading, subquadrate, strongly reflexed, the truncate apex deeply emarginate, the center orange-yellow with pale yellow, undulate margins, the under-surface with a short, fleshy, apiculate keel. Column stout, semi-terete, about 5 mm. long, produced at the base into a short, stout foot.

Panama.

COCLÉ: region north of El Valle de Antón, trail to Las Minas, 1000 m., *Allen 2868;* mossy forest on the crest of Cerro Pajita, hills north of El Valle, 1200 m., *Allen & Fairchild 3946, Allen & Allen 3792.*

34. MAXILLARIA RINGENS Rchb. f. in Walp. Ann. 6:523. 1863.

Maxillaria Tuerckheimii Schltr. in Fedde Rep. Sp. Nov. 10:295. 1912.
Maxillaria Rousseauae Schltr. in Beih. Bot. Centralbl. 36^2:413. 1918.
Maxillaria pubilabia Schltr. in Fedde Rep. Sp. Nov. Beih. 17:71. 1922.
Maxillaria Amparoana Schltr. loc. cit. 19:54. 1923.
Maxillaria Brenesii Schltr. loc. cit. 231. 1923.
Maxillaria lactea Schltr. loc. cit. 233. 1923.

Erect, epiphytic herbs with fleshy, approximate, elliptic-ovoid, compressed, monophyllous pseudobulbs 2.5–5.5 cm. long and 2–3 cm. wide, the bases enveloped in several papery, imbricating bracts which become more or less fibrous with age. Leaves coriaceous, ligular, obtuse to acute, 15–40 cm. long and 2–4.5 cm. wide, contracted below into short or elongate, conduplicate petioles. Inflorescences 1 to about 6 slender, 1-flowered scapes 5–12 cm. long, produced singly or in loose fascicles from the bases of the pseudobulbs. Flowers relatively large. Sepals free, subequal, spreading, yellow, white, or tan, sometimes shaded pink or lavender, ligular, obtuse to lanceolate, acuminate, 2.5–4 cm. long and .3–.6 cm. wide, the laterals adnate to the column foot, forming a short, rounded or subacute mentum. Petals subequal to the dorsal sepal, white or pale yellow, lanceolate, acute to acuminate, 2.2–3.5 cm. long and .25–.4 cm. wide. Lip 3-lobed near the apex, 10–15 mm. long and 6–8 mm. wide when spread out, white marked with lavender to yellow marked maroon, contracted at the base and articulated with the column foot, the lateral lobes erect, the obtuse to acute apices projecting, the mid-lobe rhombic-ovate to obovate, obtuse to acute, fleshy and more or less rugose or minutely papillose on the upper surface, about ⅓ the total length of the lip, the under-surface of the apex transversely thickened or with an acute central keel; the disk with a ligular callus about ¾ the length of the lateral lobes. Column semi-terete, somewhat arcuate, about equaling the lateral lobes of the lip, the base produced into a short foot.

Mexico, British Honduras, Guatemala, Honduras, Nicaragua, Costa Rica, Panama to Peru.

COCLÉ: region north of El Valle de Antón, 800–1000 m., *Allen 2264, 2871, 2873;*

mountains beyond La Pintada, 400–600 m., *Hunter & Allen 560*. CHIRIQUÍ: without definite locality, 4000 ft., *Powell 3443, 3466*.

A common, very variable species, widely distributed throughout the intermediate highlands of central and northern South America.

35. MAXILLARIA RUFESCENS Lindl. in Bot. Reg. 21: sub *t. 1802*. 1836.

Maxillaria Abelei Schltr. in Fedde Rep. Sp. Nov. Beih. 9:101. 1921.

Erect, epiphytic herbs with approximate, ovoid-elliptic to linear, compressed, fleshy, monophyllous pseudobulbs 2.5–4.5 cm. long and 6–22 mm. wide, the bases enveloped in several papery, imbricating bracts which become fibrous with age. Leaves coriaceous, ligular, acute or rarely acuminate, 15–32 cm. long and 1.2–3.5 cm. wide, contracted below into short or elongate, conduplicate petioles. Inflorescences slender, usually solitary, 1-flowered scapes 3.5–4 cm. long, produced from the bases of the pseudobulbs. Flowers of moderate size. Sepals subequal, free, spreading, creamy white or yellow, elliptic-oblong, obtuse to subacute, 1.4–2 cm. long and .5–.7 cm. wide, the laterals adnate to the foot of the column, forming a short, rounded mentum. Petals subequal to the dorsal sepal, white or yellow, elliptic-lanceolate, obtuse to shortly acute, 12–15 mm. long and 5–7 mm. wide. Lip conspicuously 3-lobed, orange to yellow with reddish brown or purple markings, 10–12 mm. long and 5–6 mm. wide when spread out, the base contracted and articulated with the column foot, the lateral lobes erect in natural position, the acute apices conspicuously projecting, the mid-lobe broadly oblong, about $\frac{3}{5}$ the total length of the lip, the truncate apex usually emarginate; the disk with a fleshy, ligular callus equaling or exceeding the lateral lobes in length. Column stout, somewhat arcuate, semi-terete, 10–12 mm. long, the base produced into a short foot.

Guatemala, Honduras, Nicaragua, Costa Rica, Panama, British Guiana, Peru, Brazil, Cuba, Hispaniola, Jamaica, Trinidad, and probably other adjacent areas.

COCLÉ: mountains beyond La Pintada, 400–600 m., *Hunter & Allen 563*; vic. El Valle de Antón, 600–1000 m., *Allen 1255*.

36. MAXILLARIA UMBRATILIS L. Wms. in Ann. Mo. Bot. Gard. 28:425. 1941.

Camaridium nutantiflorum Schltr. in Beih. Bot. Centralbl. 36^2:417. 1918, non *Maxillaria nutantiflora* Schltr.

Erect or pendulous, epiphytic herbs with elongate, sometimes branching stems. Pseudobulbs elliptic-ovoid, ancipitous, monophyllous, 2.5–4 cm. long and 1.5–2 cm. wide, very distantly and obliquely inserted on the canes, the lower half covered by the conduplicate bases of the 3–5 long-foliaceous bracts; the long internodes naked or enveloped in the persistent bases of the imbricating bracts. Leaves of the apex of the pseudobulb and those of the basal long-foliaceous bracts subcoriaceous, ligular, acute or obtuse, 8–30 cm. long and 1.2–2.2 cm. wide. Inflorescences slender, 1-flowered scapes 3–5 cm. long, produced from the bract axils of the elongate, complanate flush of new growth. Flowers of moderate size. Sepals

free, subequal, spreading, yellowish green, lanceolate, acute, 2–2.5 cm. long and 4–6 mm. wide, the laterals adnate to the foot of the column, forming a short, rounded mentum. Petals subequal to the dorsal sepal and similarly colored, obliquely lanceolate, acute to acuminate, 15–18 mm. long and 3.5–5 mm. wide. Lip conspicuously 3-lobed, red or marked with red, 10–12 mm. long and 10–12 mm. wide when spread out, the base contracted and articulated with the foot of the column, the lateral lobes subfalcate, acute, erect in natural position and somewhat incurving over the column, the apices projecting, the mid-lobe ovate, acute, about ½ the total length of the lip; disk with a short, broad, truncate, fleshy callus about ⅓ the length of the lateral lobes. Column very short, stout, about 5 mm. long, produced at the base into a short foot.

Costa Rica and Panama.

CHIRIQUÍ: vic. Bajo Chorro, headwaters of the Río Caldera, in rain forest, 6000 ft., *Davidson 308*.

37. MAXILLARIA UNCATA Lindl. in Bot. Reg. 23: sub *t. 1986*. 1837.

Maxillaria Macleei Batem. ex Lindl. in Bot. Reg. 26: Misc. 70. 1840.
Maxillaria stenostele Schltr. in Beih. Bot. Centralbl. 36^2:414. 1918.

Slender, erect or pendulous, epiphytic herbs with short to elongate, often branching stems 4–40 cm. long. Pseudobulbs minute, linear-complanate to terete, monophyllous, 4–10 mm. long and 2–3.5 mm. wide, approximate to rather remote, obliquely inserted on the stems, pseudobulbs and internodes enveloped in broad, brown, imbricating, scarious sheaths. Leaves fleshy, subulate-conduplicate, semiterete or rarely lanceolate-elliptic, acute to acuminate, 2–6 cm. long and .2–1.0 cm. wide. Inflorescences short, usually solitary, 1-flowered scapes 10–20 mm. long, produced from the base of the current mature growth. Flowers small, translucent with red or purple stripes. Sepals free, not spreading, the dorsal sepal oblong, obtuse to acute, concave, 7–9 mm. long and about 3 mm. wide, the laterals lanceolate, acute, 10–12 mm. long and 3–4 mm. wide, the very long, oblique bases adnate to the foot of the column, forming an elongate, conspicuous, obtuse to subacute mentum. Petals ligular to oblanceolate, acute, about equaling the dorsal sepal in length. Lip linear-oblanceolate, obtuse to subacute, entire, somewhat exceeding the lateral sepals, 12–14 mm. long and 3–3.5 mm. wide at the apex, the long narrow base slightly concave and articulated with the foot of the column, the subrotund to subacute apex often with undulate margins; the disk with a linear, obtuse callus about ½ the total length of the lip. Column elongate, semiterete, somewhat arcuate, the apex with short, lateral, subfalcate, deflexed wings; the base produced into an elongate foot.

British Honduras, Guatemala, Honduras, Costa Rica, Panama, Peru, British Guiana, Brazil, and probably adjacent areas.

CANAL ZONE: Río Pequení, upper Madden Lake region, 66–70 m., *Dodge, Steyermark & Allen 16752*. PANAMÁ: hills east of Panama City, sea level to about 200 ft., *Powell 120*. COLÓN: Quebrada López, lower forested slopes of Cerro Santa Rita, about 30 m., *Allen 2141*. COCLÉ: hills north of El Valle de Antón, 600–1000 m., *Allen 1682, 3715*. BOCAS DEL TORO: without definite locality, *von Wedel 489*.

38. MAXILLARIA VAGANS Ames & Schweinf. in Sched. Orch. 8:65. 1925.

Erect or pendulous, epiphytic herbs with stout, simple or branching stems 15–45 cm. long, the lower portions usually conspicuously enveloped in numerous fibrous roots. Pseudobulbs fleshy, monophyllous, elliptic-oblong, compressed and rugose, 1.5–3 cm. long and 1.0–1.5 cm. wide, approximate or distant, inserted at an acute angle on the stems, the current pseudobulb partly covered by the conduplicate bases of several long-foliaceous bracts, the internodes and old pseudobulbs entirely invested by the persistent bract bases. Leaves of the apex of the pseudobulbs and the blades of the foliaceous bracts coriaceous, ligular, obtuse, or the apex retuse and unequally bilobed, 4.5–18 cm. long and 1–2.5 cm. wide. Inflorescences slender, 1-flowered scapes 3–4 cm. long, usually produced from the base of the current mature pseudobulb but sometimes from the axils of the flush of new growth. Flowers of moderate size. Sepals free, spreading, red or pink with yellow or green margins, the dorsal sepal linear-lanceolate to elliptic-lanceolate, acute, arching over the column, 1.7–2.3 cm. long and .5–.7 cm. wide, the dorsal surface with a keel which terminates in an apicule, the lateral sepals spreading, elliptic-lanceolate, acute, 1.8–2.2 cm. long and .5–.7 cm. wide, adnate at the base to the column foot, forming a short, rounded mentum. Petals ligular to oblanceolate, acute, similarly colored with the sepals, 1.5–2 cm. long and .5–.6 cm. wide. Lip conspicuously 3-lobed, red margined white, or yellow with the apical lobe spotted rose-pink, 12–16 mm. long and 6–8 mm. wide, contracted at the base and articulated with the foot of the column, the lateral lobes rounded, erect in natural position, the mid-lobe fleshy, obovate, acute, canaliculate, with ascending margins, more than half the total length of the lip, the lower surface with a strongly developed keel; disk with a short, fleshy, emarginate callus. Column semi-terete, somewhat arcuate, 6–8 mm. long, produced at the base into a short foot. Anther terminal, operculate, incumbent, 1-celled.

Costa Rica and Panama.

COCLÉ: mountains beyond La Pintada, 400–600 m., *Hunter & Allen 598;* region north of El Valle de Antón, trail to Las Minas, 1000 m., *Allen 2893;* mossy forest on crest of Cerro Pajita, hills north of El Valle, 1000 m., *Allen 4177.* CHIRIQUÍ: Palo Alto, 4500–5000 ft., *Powell 348.*

A fairly frequent highland species closely allied to *Maxillaria cucullata.*

39. MAXILLARIA VALENZUELANA (A. Rich.) Nash, in Bull. Torr. Bot. Club. 34:121. 1907.

Dicrypta iridifolia Batem. in Loud. Hort. Brit. Suppl. 2:630. 1839, nomen nudum.
Pleurothallis valenzuelana A. Rich. in Sagra, Hist. Isla Cuba 11 [Fl. Cub. Fanerog.]:234. 1850.
Maxillaria iridifolia (Batem.) Rchb. f. in Bonplandia 2:16. 1854.
Dicrypta irisphyta Barb. Rodr. Gen. & Spec. Orch. 1:126. 1877.

Pendulous epiphytic herbs without pseudobulbs. Leaves distichously arranged in the form of a broad fan, rather fleshy, gladiate, lanceolate, acuminate, 9–30 cm. long and 1.0–2.5 cm. wide, the broad conduplicate bases closely imbricating. In-

florescences short, 1-flowered scapes, solitary or in dense fascicles in the axils of the leaves. Flowers of moderate size. Sepals free, subequal, spreading, yellow, elliptic-lanceolate, acute, 10–12 mm. long and 4–6 mm. wide, the laterals somewhat oblique, the bases adnate to the column foot, forming an inconspicuous, rounded mentum. Petals lanceolate, acute, yellow, 8–10 mm. long and 2.5–3.5 mm. wide. Lip entire or obscurely 3-lobed, yellow with purple or maroon markings, elliptic-ovate, acute, 9–11 mm. long and 4–5 mm. wide when spread out, the base contracted and articulated with the column foot, the lateral margins erect in natural position, the mid-lobe thickened at the apex and on the margins, about ½ the total length of the lip; disk with a ligular callus running the full length of the lip, somewhat thickened near the apices of lateral margins. Column short, stout, somewhat arcuate, produced at the base into a short foot.

Cuba, Honduras, Costa Rica, Panama, Colombia, Venezuela, Brazil, and probably adjacent areas.

CHIRIQUÍ: vic. Boquete, 3800 ft., *Davidson 636.*

A frequent, pendulous, fan-leaved epiphyte of the Chiriquí highlands.

40. MAXILLARIA VARIABILIS Batem. ex Lindl. in Bot. Reg. 23: sub *t. 1986.* 1837.

Maxillaria Henchmanni Hook. in Bot. Mag. *t. 3614.* 1837.
Maxillaria angustifolia Hook. Ic. Plant. 4: *t. 348.* 1841.
Maxillaria Lyonii Lindl. in Bot. Reg. n. s. 8: Misc. 17. 1845.
Maxillaria revoluta Kl. in Allgem. Gartenzeit. 20:186. 1852.
Maxillaria chiriquensis Schltr. in Fedde Rep. Sp. Nov. Beih. 17:68. 1922.
Maxillaria panamensis Schltr. loc. cit. 70. 1922.
Maxillaria costaricensis Schltr. loc. cit. 19:232. 1923.

Erect or pendulous, epiphytic herbs with short or elongate, usually simple stems of very variable vegetative appearance, 5–30 cm. long. Pseudobulbs linear to elliptic-oblong, subcylindric to strongly ancipitous, usually rugose, 1.5–6 cm. long and .3–2.0 cm. wide, approximate and inserted at an acute angle on the stems, the truncate apices monophyllous, the internodes and bases enveloped in closely imbricating, papery bracts. Leaves coriaceous, ligular, obtuse or 2-lobed at the apex, 3–15 cm. long and .3–1.6 cm. wide, contracted below into very short, conduplicate petioles. Inflorescences slender, 1-flowered, often solitary scapes produced from the bract axils of the flush of new growth, or sometimes from the base of the current mature pseudobulb. Flowers usually of moderate size or small, white or yellow marked with dark red, or with a red lip, or entirely dark red. Sepals subequal, free, more or less spreading, linear-lanceolate to elliptic-lanceolate, obtuse, with a minute apicule or sometimes acute, 6–12 mm. long and 2–4 mm. wide, the laterals adnate to the foot of the column, forming a short, subacute mentum. Petals lanceolate to oblanceolate, acute, 5–10 mm. long and 1.5–3.5 mm. wide. Lip entire or obscurely 3-lobed near the apex, 6–12 mm. long and 3–6 mm. wide when spread out, the base articulated with the column foot, the lateral margins rounded and erect in natural position, the mid-lobe subacute to truncate and

shallowly emarginate, about ⅓ the total length of the lip; the disk with a ligular, obtuse callus nearly equalling the lateral lobes. Anther terminal, operculate, incumbent, 1-celled.

Mexico, British Honduras, Guatemala, Salvador, Honduras, Nicaragua, Costa Rica, Panama, British Guiana, and probably adjacent territories.

PANAMÁ: hills near Panama City, sea level, *Powell 124*. COCLÉ: vic. El Valle de Antón, 600–1000 m., *Allen 1252, 3716, 3813*. CHIRIQUÍ: without definite locality, 4000 ft., *Powell 125*; vic. Boquete, 4000–4500 ft., *Powell 418*; Cerro de Lino, vic. Boquete, 1000–1300 m., *Pittier 3017*; vic. Boquete, 3800 ft., *Davidson 645*; vic. Monte Lirio, upper Río Chiriquí Viejo, *G. White 38*; vic. New Switzerland, Río Chiriquí Viejo, 1800–2000 m., *Allen 1339*.

41. MAXILLARIA WERCKLEI (Schltr.) L. Wms. in Ann. Mo. Bot. Gard. 27:284. 1940.

Ornithidium Wercklei Schltr. in Fedde Rep. Sp. Nov. Beih. 19:60. 1923.
Maxillaria aurantiaca Schltr. loc. cit. 27:87. 1924.
Maxillaria Lankesteri Ames, in Sched. Orch. 7:11. 1924.

Erect or pendulous, epiphytic herbs with slender, branching stems 3–20 cm. tall. Pseudobulbs linear, compressed, rugose in dried specimens, 4–25 mm. long and 1.5–5 mm. wide, distantly inserted on the stems, the truncate apices monophyllous, the bases with 2–3 conspicuous, long-foliaceous bracts, the long internodes enveloped in persistent, closely imbricating, complanate sheaths. Leaves of the apex of the pseudobulbs and the blades of the foliaceous bracts coriaceous, ligular to elliptic-lanceolate, broadly obtuse, or retuse at the apex, 1–3 cm. long and .2–1.2 cm. wide, contracted below into very short, subsessile, conduplicate petioles. Inflorescences slender, 1-flowered scapes 4–10 mm. long, produced from the bract axils of the flush of new growth. Flowers very variable, small or of moderate size, usually tan striped red or brown to dark reddish purple. Sepals subequal, free, spreading, lanceolate to elliptic-lanceolate, acute, 5–12 mm. long and 2.5–5 mm. wide, the apices sometimes carinate, the laterals adnate to the foot of the column, forming a short, rounded mentum. Petals subequal to the dorsal sepal, oblong-lanceolate, obtuse to subacute, 4–11 mm. long and 2–4 mm. wide. Lip 3-lobed near the base, 4–10 mm. long and 3–6 mm. wide, contracted at the base and articulated with the column foot, the short, lateral lobes rounded or subacute, obliquely erect in natural position, separated near the apices by a transverse, fleshy callus, mid-lobe elliptic-ovate to oblong, convex, the margins often deflexed or revolute, the apex obtuse to subacute, ⅗ to ¾ the total length of the lip. Column short, stout, semi-terete, somewhat arcuate, produced at the base into a distinct foot. Anther terminal, operculate, incumbent, 1-celled.

Costa Rica, Panama, and Colombia.

COCLÉ: hills north of El Valle de Antón, 1000 m., *Allen 1253*.

(To be concluded in Part III, Fasc. 5)

FLORA OF PANAMA

Part III. Fascicle 4

ORCHIDACEAE

By PAUL H. ALLEN

66. TRIGONIDIUM Lindl.

TRIGONIDIUM Lindl. in Bot. Reg. 23: *t. 1923*. 1837; Benth. & Hook. Gen. Pl. 3:567. 1883.

Caespitose, erect, repent, or scandent epiphytic herbs with short ovoid or elliptic-ovoid, compressed, usually ridged and sulcate pseudobulbs, the apices with 1–5 linear to elliptic-lanceolate, coriaceous or subcoriaceous leaves. Inflorescences simple, slender, short or elongate, 1-flowered scapes produced from the bases of the pseudobulbs. Flowers relatively large. Sepals subequal, the bases connivent, forming a tube, the apical portions spreading or reflexed. Petals much smaller than the sepals. Lip distinctly 3-lobed, very small, shorter than the petals, the lateral lobes erect and paralleling the column, the mid-lobe spreading, often thickened or tuberculate, the apex usually recurved; disk with a fleshy, usually ligular callus. Column short, rather stout, semiterete, wingless, the base without a foot. Anther terminal, operculate, incumbent, 1-celled; pollinia 4, waxy.

A small genus of tropical American epiphytes, ranging from Mexico to Brazil. Two species are known from Panama.

a. Pseudobulbs approximate, the apex with 2 leaves. Petals not apiculate. Lowland species ..... 1. T. EGERTONIANUM
aa. Pseudobulbs widely separated on a cylindric rhizome, the apex with 3–5 leaves. Petals conspicuously apiculate. Highland species ..... 2. T. LANKESTERI

1. TRIGONIDIUM EGERTONIANUM Batem. ex Lindl. in Bot. Reg. n. s. 1: Misc. 73. 1838.

Trigonidium Seemanni Rchb. f. in Seem. Bot. Voy. Herald, p. 214. 1854.

Erect epiphytic herbs with approximate, ovoid to elliptic-ovoid, ridged and sulcate, diphyllous pseudobulbs 3.5–7 cm. long and 1.5–4 cm. wide, the bases enveloped in 3–5 brown, imbricating bracts which become fibrous with age. Leaves subcoriaceous, linear-lanceolate, acute, 20–60 cm. long and .8–3 cm. wide, contracted below into slender, conduplicate petioles. Inflorescences 1 to several

Issued June 18, 1949.

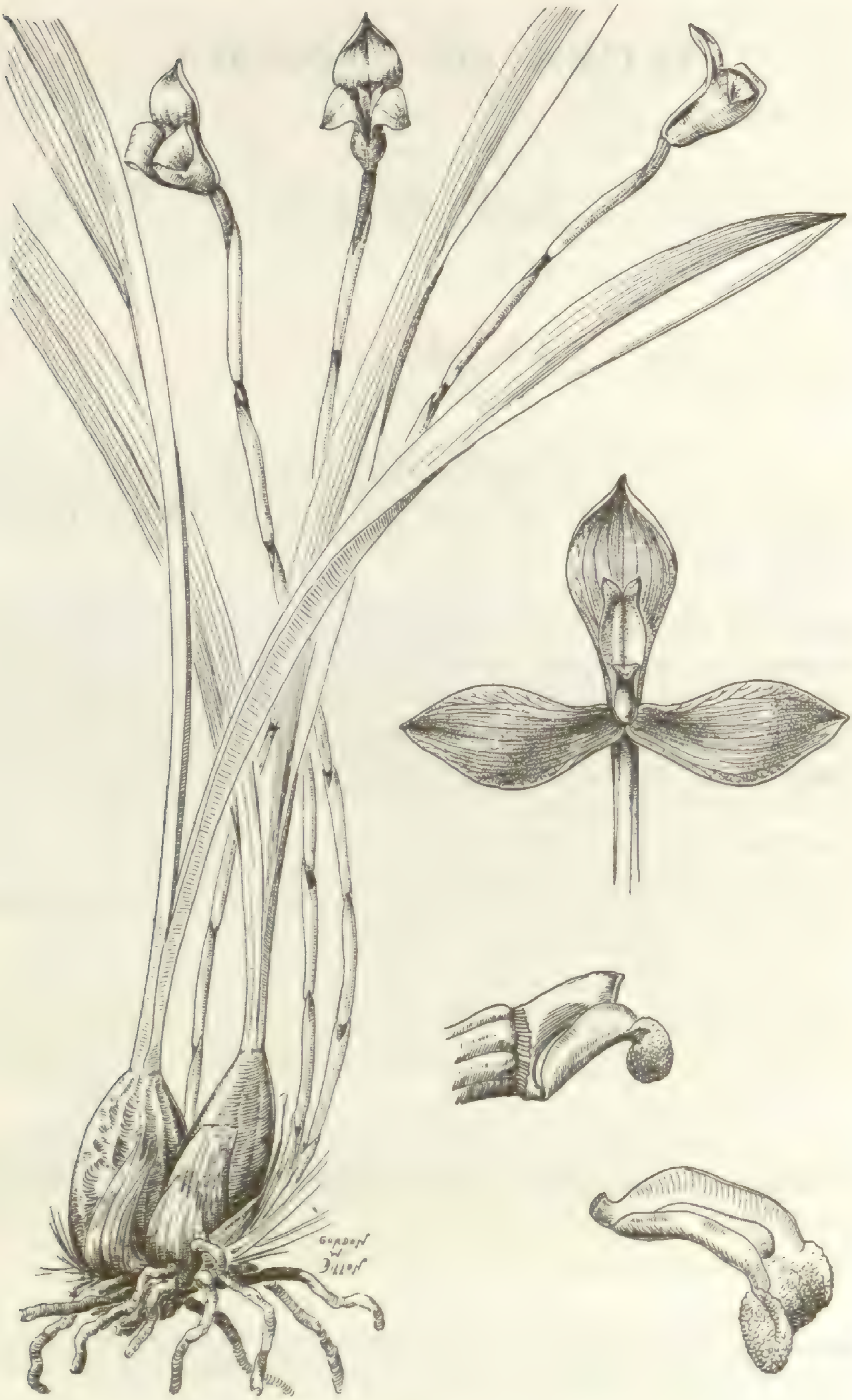


Fig. 186. *Trigonidium Egertonianum*

slender, erect, 1-flowered scapes, 20–40 cm. long, produced from the bases of the pseudobulbs, enveloped throughout in tubular, papery, imbricating bracts. Flowers relatively large. Sepals free, the bases connivent, forming a tube, usually greenish yellow to pinkish tan, with brown or purple stripes; the dorsal sepal elliptic-oblanceolate, acute, spreading, 2.5–4.5 cm. long and 1–2 cm. wide, the laterals obliquely oblong to elliptic-lanceolate, acute, the apices strongly recurved, 27–42 mm. long and 8–14 mm. wide. Petals lanceolate to oblanceolate, acute, greenish yellow to pinkish tan, striped brown or purple, 12–22 mm. long and 4–6 mm. wide, with a brown to purple gland-like thickening near the apex. Lip 3-lobed, about ⅓ the length of the petals, yellowish tan striped brown or red, 5–6 mm. long and 3–4 mm. wide when spread out, contracted at the base and articulated with the base of the column, the lateral lobes erect and paralleling the column, the mid-lobe ovate, acute, pale yellow with a darker center, rather fleshy, ⅓ to ⅖ the total length of the lip, the apex recurved and verrucose on both the upper and lower surfaces, the disk with a fleshy ligular callus about equaling the lateral lobes in length. Column semiterete, purple, 4–5 mm. long, the base footless.

Mexico, British Honduras, Guatemala, Salvador, Honduras, Nicaragua, Costa Rica, Panama, and Colombia.

CANAL ZONE: vicinity Frijoles, sea level, *Powell 3023;* drowned forest of the upper Río Pequení, Madden Lake region, 70 m., *Allen 17281;* forest along banks above Río Indio Hydrographic Station, Madden Lake region, 70–75 m., *Steyermark 17426;* vicinity Gamboa, 20–100 m., *Pittier 2613;* Barro Colorado Island, Gatún Lake, *Zetek s. n., Woodworth & Vestal 593.* PANAMÁ: along road to Pacora, about 50 m., *Allen 820;* hills east of Panama City, *Powell 44.* COLÓN: Cerro Santa Rita, 1200 ft., *Allen & Fairchild 5194;* Río Gatuncillo, vicinity Santa Rosa, 100 ft., *Allen & Allen 4159.* VERAGUAS: Bahia Honda, *Taylor 1515; Elmore H-48;* vicinity Soná, about 100 ft., *Allen & Allen 4240.* BOCAS DEL TORO: vicinity Chiriquí Lagoon, *von Wedel 2096.*

A very common lowland species widely distributed in Central America. It seems probable that it may represent a northern variant of the generic type, *Trigonidium obtusum* Lindl. of British Guiana and Brazil, differing only in the narrower leaves and the absence of an apparently distinct verrucose callus on the under-surface of the apex of the lip.

2. TRIGONIDIUM LANKESTERI Ames, in Sched. Orch. 5:32. 1923.

Repent or scandent, epiphytic herbs with ovoid, compressed, ridged and sulcate, tapering pseudobulbs 4–8 cm. tall and 2–3 cm. wide at the base, very distantly spaced on the elongate, cylindric rhizome, the internodes 15–40 cm. long, enveloped in numerous tubular, papery bracts which weather away, the basal portion of the pseudobulbs freely rooting and covered by several rigid, imbricating sheaths which soon weather into loose fibers, the apex of the pseudobulbs with 3–5 leaves. Leaves subcoriaceous, oblong-lanceolate, acute, 15–27 cm. long and 3–4 cm. wide, contracted below into slender, conduplicate petioles which are more or less distichously arranged on the apex of the pseudobulbs. Inflorescences short, usually solitary, 1-flowered scapes 8–16 cm. long, produced from the bases of the pseudobulbs. Sepals subequal, free, the basal half, together with the petals, connivent

and forming a tube, the petals visible between the margins of the dorsal and lateral sepals, the apical half of the sepals strongly reflexed, light greenish tan to cinnamon, veined brown or purplish, elliptic-oblanceolate, acute, 4.5–5 cm. long and 1.6–2 cm. wide, the dorsal sepal a little narrower than the laterals. Petals broadly oblanceolate, the apices abruptly spreading and conspicuously apiculate or aristate, light greenish tan, veined brown, with purple spots, 20–24 mm. long and 8–10 mm. wide, with an irregular subventricose swelling on the inside below the apicule. Lip 3-lobed, white spotted brown, about 15 mm. long and 5 mm. wide, oblanceolate when spread out, the base contracted and articulated with the base of the column, the lateral lobes erect in natural position, the triangular acute apices projecting, the mid-lobe ovate, obtuse, fleshy, strongly recurved, about ½ the total length of the lip, the upper-surface minutely glandular, the under-surface strongly verrucose, the disk with a ligular, fleshy callus about equaling the lateral lobes in length. Column semiterete, somewhat arcuate, about 1 cm. long, the base without a foot.

Costa Rica and Panama.

COCLÉ: hills north of El Valle de Antón, 800–1000 m., *Allen 2290*.

An exteremely distinctive highland species, immediately separable from the common lowland *Trigonidium Egertonianum* by the elongate rhizome, the 3- to 5-leaved pseudobulbs, the larger flowers, and the apiculate petals.

67. CRYPTOCENTRUM Benth.

CRYPTOCENTRUM Benth. in Jour. Linn. Soc. 18:325. 1881, nom. nud.; Benth. & Hook. Gen. Pl. 3:557. 1883.

Pittierella Schltr. in Fedde Rep. Sp. Nov. 3:80. 1906.

Small erect, epiphytic herbs with 1 to several short stems, usually without pseudobulbs, the cylindric basal portions of the stems enveloped in the rigid, persistent leaf bases. Leaves approximate, 2-ranked, linear to ligular, coriaceous, usually confined to the upper portions of the stems. Inflorescences few to numerous, slender, erect or arching, 1-flowered scapes produced from the bases of the plants, usually less than (but sometimes exceeding) the leaves, the peduncles enveloped in tubular, acute or acuminate, papery sheaths, the uppermost of which is much the longest, completely covering the ovary, only the perianth segments of the flowers being exserted. Flowers relatively small. Sepals narrow, the free portions widely spreading, the dorsal sepal usually a little shorter than the laterals, the bases of which are connate and produced into a long, narrow spur which is appressed to the ovary and nearly equaling it in length. Petals subequal to the dorsal sepal or smaller. Lip continuous with the base of the column, produced into an elongate tubular projection contained within, and nearly equaling the sepaline spur, the free limb entire or more or less divided into a basal and an apical half, the basal half concave to subsaccate, the erect lateral margins enclosing

the column, the apical half usually lanceolate or elliptic-lanceolate and spreading. Column short, very stout, wingless but with the apex usually with a pair of lateral auricles covering the clinandrium, the base without a foot. Anther terminal, operculate, incumbent, 1-celled; pollinia 2–4, waxy.

A small genus of tropical American highland epiphytes, ranging from Costa Rica to Peru. Until more adequate collections are available for study, it would be profitless to speculate on the possible number of valid entities. Although the described species vary considerably in size, the flowers of most seem to be remarkably constant in structure, so that many of the names may eventually be reduced to synonymy or some perhaps retained as local varieties of a few somewhat polymorphic species. Four entities are separable in Panama, largely on a basis of size and vegetative habit.

a. Plants less than 3 cm. tall. Inflorescences conspicuously exceeding the leaves ..... 4. C. STANDLEYI
aa. Plants more than 6 cm. tall. Inflorescences less than, or barely equaling the leaves.
  b. Plants 6–12 cm. tall. Leaves 3.5 mm. wide or less. Spur 1.2–2.0 cm. long ..... 1. C. GRACILIPES
  bb. Plants more than 12 cm. tall. Leaves 3.5 mm. wide or more. Spur about 3 cm. long.
    c. Leaves narrowly linear, acuminate ..... 2. C. INAEQUISEPALUM
    cc. Leaves broadly ligular, unequally emarginate ..... 3. C. LATIFOLIUM

1. CRYPTOCENTRUM GRACILIPES Schltr. in Fedde Rep. Sp. Nov. Beih. 19:246. 1923.

Erect, usually caespitose, epiphytic herbs without pseudobulbs, the plants 6–12 cm. tall. Leaves coriaceous, spreading, approximate, linear-ligular, the apices obtuse or unequally emarginate, 5–10 cm. long and 0.2–0.5 cm. wide, the sheathing bases contracted into short cylindric petioles. Inflorescences numerous slender, erect or arching, 1-flowered scapes usually nearly equaling the leaves in length, enveloped throughout in several papery, tubular, imbricating sheaths. Flowers small, tan or brownish olive. Sepals oblong, obtuse, widely spreading, the free portions 10–13 mm. long and 2.5–3 mm. wide, the laterals oblique and rather narrower than the dorsal sepal, the bases connate and produced into an elongate spur 1.2–2 cm. long, parallel with the ovary and about equaling it in length. Petals obliquely elliptic-lanceolate, acute, 8–10 mm. long and 2–2.5 mm. wide. Lip entire, the free limb lanceolate, obtuse to subacute, 6–8 mm. long and 2.5–3 mm. wide, the base continuous with the base of the column and produced into a long narrow tube which is contained within the elongate, sepaline spur. Column short, stout, about 2 mm. long, the base footless.

Costa Rica and Panama.

COCLÉ: hills north of El Valle de Antón, 1000 m., *Allen 1911*.

2. CRYPTOCENTRUM INAEQUISEPALUM C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 12:186. 1946.

Erect, epiphytic herbs without pseudobulbs, the plants 15–25 cm. tall, the short, cylindric stems enveloped below in the persistent leaf bases, the apical por-

tions with 2-ranked foliage. Leaves approximate, linear, acuminate, coriaceous, 12–23 cm. long and 0.35–0.6 cm. wide. Inflorescences numerous slender, 1-flowered scapes produced from the base of the stem, the peduncles entirely invested by several papery, tubular sheaths. Flowers relatively large for the genus, described as being greenish yellow and translucent. Sepals widely spreading above, lanceolate, acute, the dorsal sepal about 15 mm. long and 3.7 mm. wide, the lateral sepals oblique, the free parts about 19 mm. long and 3 mm. wide, the bases connate and produced into an elongate spur which is closely appressed to and about equaling the ovary in length. Petals obliquely lanceolate, acuminate, about 13 mm. long and 3 mm. wide. Lip continuous with the base of the column, the free limb ovate-lanceolate, acute to acuminate when spread out, about 10 mm. long and 4.2 mm. wide, the lower half deeply concave to subsaccate in natural position, the lateral margins enclosing the column, the base produced into a long slender tube contained within the sepaline spur. Column very short, stout, about 2 mm. long, the clinandrium shielded by 2 broad lateral auricles, the base without a foot.

Panama and Peru. To be expected in Colombia and Ecuador.

CHIRIQUÍ: vicinity Bajo Chorro, headwaters of the Río Caldera, in rain forest, 6000 ft., *Davidson 160*.

Our specimens have thicker leaves, but in other respects seem to agree with the Peruvian type.

3. CRYPTOCENTRUM LATIFOLIUM Schltr. in Fedde Rep. Sp. Nov. Beih. 19:247. 1923.

Erect, epiphytic herbs without pseudobulbs, the plants 18–25 cm. tall, the short cylindric stems often solitary and apparently monopodial, enveloped below in the rigid, brown, persistent, imbricating leaf bases. Leaves approximate, spreading, broadly ligular, coriaceous, 16–23 cm. long and 1.5–2 cm. wide, the apices rounded and unequally emarginate. Inflorescences a few erect or arching, 1-flowered scapes 8–16 cm. long, produced from the bases of the stems, the peduncles completely invested by several acute, tubular, papery sheaths. Flowers relatively large, rather fleshy, greenish olive or greenish tan. Sepals widely spreading above, the free portions narrowly ligular-lanceolate, acute, 3.5–5 cm. long and 0.5–0.6 cm. wide, the margins often strongly revolute, the lateral sepals oblique, the bases connate and produced into an elongate spur which is closely appressed to the ovary and about equaling it in length. Petals obliquely lanceolate, acute, 3–4 cm. long. Lip continuous with the base of the column, the free portion lanceolate, subacute, about 1.5 cm. long and 0.5 cm. wide, the base produced into an elongate tube which is contained within the sepaline spur, as in the genus. Column short, stout, about 4 mm. long.

Costa Rica and Panama.

COCLÉ: region north of El Valle de Antón, vicinity La Mesa, 1000 m., *Dunn s. n.* (under *Allen 2762*).

A curious highland species, vegetatively reminiscent of a small *Aerides* or *Vanda*. Our specimen has somewhat smaller measurements than those given for the Costa Rican type, but otherwise seems nearer to it than to any other. Sterile plants of evidently the same species are fairly frequent on the eastern slopes of Chiriquí Volcano between 5000 and 7000 ft.

4. CRYPTOCENTRUM STANDLEYI Ames, in Sched. Orch. 9:55. 1925.

Dwarf, epiphytic herbs without pseudobulbs, the tufted plants less than 3 cm. tall. Stems cylindric, rather stout, the lower half covered by the persistent, imbricating leaf bases, the upper half with approximate, more or less 2-ranked foliage. Leaves narrowly linear to oblanceolate, obtuse to subacute, often conduplicate, coriaceous, 5–15 mm. long and 1–2.5 mm. wide. Inflorescences usually 1–2 erect, filiform, 1-flowered scapes 3–4 cm. long, produced from the lower axils of the leaves and conspicuously exceeding the foliage in height. Flowers small, dull red or tan. Sepals spreading, the free portions elliptic-lanceolate, acute, 6–8 mm. long and 1.5–2 mm. wide, the laterals connate at the base and produced into an elongate, slender spur which is closely appressed to the ovary and about equaling it in length. Petals lanceolate, acute, 5–7 mm. long and 1.5–2 mm. wide. Lip continuous with the base of the column, the free portion strongly concave, lanceolate, acute, 6–8 mm. long and about 2 mm. wide, the base prolonged into a slender tube contained within the sepaline spur. Column 2.2–2.5 mm. long, the apex with two lateral auriculate projections.

Costa Rica and Panama.

COCLÉ: hills north of El Valle de Antón, 600–1000 m., *Allen 1685*.

68. TRICHOCENTRUM Poepp. & Endl.

TRICHOCENTRUM Poepp. & Endl. Nov. Gen. & Sp. 2:11, *t. 115*. 1837[1]; Benth. & Hook. Gen. Pl. 3:559. 1883.

Acoidium Lindl. in Bot. Reg. 23: *t. 1951*. 1837, nom. nud.

Small, epiphytic herbs with very short, monophyllous stems which are thickened into short, inconspicuous pseudobulbs. Leaves elliptic-lanceolate to ligular, coriaceous or fleshy. Inflorescences usually simple, rarely branching, 1- or rarely 2-flowered scapes, usually very short, but sometimes nearly equaling the leaves. Flowers of moderate size to relatively large. Sepals subequal, free, spreading. Petals subequal to the sepals. Lip entire or obscurely 3-lobed, produced at the base into a spur. Column stout or slender, erect, the apex clavate or with prominent lateral wings or auricles, the base without a foot. Anther terminal, operculate, incumbent, 1-celled, often pubescent or papillose; pollinia 2, waxy.

Perhaps fifteen species of tropical American epiphytes, ranging from Mexico to Peru and Brazil. One species is known from Panama.

[1] The date of publication appearing on the title page of this volume is 1838, but evidently parts of it must have been published or in some way available for use earlier since Lindley (in Bot. Reg. 23: *t. 1951*, April 1, 1837) cited the generic name *Trichocentrum* and the place of publication.

1. Trichocentrum panamense Rolfe, in Kew Bull. 341. 1913.

Dwarf, epiphytic herbs with minute, monophyllous pseudobulbs, the plants 3–12 cm. tall. Leaves elliptic-lanceolate to ligular, acute, fleshy, 2.5–10 cm. long and 0.8–2.5 cm. wide. Inflorescences slender, horizontal or pendulous, usually unbranched scapes 0.8–4 cm. long, which apparently elongate by progressive stages, producing a succession of moderate-sized solitary flowers. Sepals subequal, free, spreading, pale green or greenish yellow, lanceolate, acute, 10–12 mm. long and 3–4 mm. wide. Petals pale green or greenish-yellow, oblong-lanceolate, acute, 10–12 mm. long and 3–4 mm. wide. Lip elliptic-ovate, obtuse to acute, explanate or concave, white with a reddish-brown or reddish-purple blotch at the base, the free portion 10–12 mm. long and about 6 mm. wide, the base adnate to the base of the column and produced into a broad, flattened, rather obscurely 4-lobed spur. Column stout, about 5 mm. long, the apex with a pair of broad, fleshy, spreading, subfalcate, obtuse wings on either side of the clinandrium, the base without a foot. Anther white, papillose.

Panama.

CANAL ZONE: trail from Fort Sherman to the mouth of the Río Chagres, sea level, *Powell 371*; upper Río Chagres, sea level, *Powell 419*. PANAMÁ: Cerro Campana, vicinity Campana, 600–800 m., *Dorothy Allen 3989, 4455*. COCLÉ: lower valley and marshes along the Río Antón, 500–600 m., *Hunter & Allen 384, Dorothy Allen 3953, 5077*.

This species is very variable in regard to the size and shape of the leaves, and the length of the inflorescences.

69. IONOPSIS HBK.

Ionopsis HBK. Nov. Gen. & Sp. 1:348, *t. 83*. 1815; Benth. & Hook. Gen. Pl. 3:567. 1883.
Inopsis Steud. Nom. ed. 1, 432. 1821.
Iantha Hook. Exot. Fl. 2: *t. 113*. 1825.
Cybelion Spreng. Syst. 3:679. 1826.

Epiphytic herbs with short, subcylindric stems invested in 2-ranked foliage, the sheathing leaf bases with or without minute pseudobulbs. Leaves approximate, narrow, coriaceous, the bases imbricating. Inflorescences 1–3 slender, short to elongate, erect or arching, simple or paniculate scapes subterminal or lateral from the axils of the leaves. Flowers of moderate size to small. Sepals subequal, erect or spreading, the dorsal sepal free, the laterals connate at the base and produced into a short sac below the lip. Petals subequal to the dorsal sepal or broader. Lip clawed and adnate to the base of the column, the apical portion broadly expanded, entire or emarginate, conspicuously exceeding the sepals. Column short, stout, erect, the lateral margins not winged, the base without a foot. Anther terminal, operculate, incumbent, 1-celled or imperfectly 2-celled; pollinia 2, waxy.

A small genus of American epiphytes, ranging from Florida and Mexico through Central America and the West Indies to South America, as far as Bolivia and Paraguay. One species is known from Panama.

Fig. 187. *Ionopsis utricularioides*

1. Ionopsis utricularioides (Sw.) Lindl. Coll. Bot. *t. 39-A.* 1821.

Epidendrum utricularioides Sw. Prodr. 122. 1788.
Dendrobium utricularioides Sw. in Nov. Act. Soc. Upsal. 6:83. 1799.
Iantha pallidiflora Hook. Exot. Fl. 2: *t. 113.* 1824.
Ionopsis tenera Lindl. in Bot. Reg. 22: *t. 1904.* 1836.
Ionopsis pallidiflora Lindl. loc. cit. sub. *t. 1904.* 1836.
Ionopsis paniculata Lindl. loc. cit. 1836.
Ionopsis zonalis Lindl. & Paxton, in Paxton's Flow. Gard. 2:13. 1851–53, in textu.

Epiphytic herbs 5–12 cm. tall. Leaves approximate, linear-lanceolate to oblong-lanceolate, acute, the blades 3.5–12 cm. long and 0.5–1.5 cm. wide, the midvein forming a keel on the under-surface, the sheathing bases sometimes enveloping a minute pseudobulb. Inflorescences 1–3 slender, erect or arching, simple or paniculate scapes 15–60 cm. long, produced from the lateral or subterminal leaf axils, provided with a few distant, inconspicuous sheaths. Flowers few to many, small to relatively large and conspicuous, lavender, rose-purple, or white, superficially resembling those of some species of *Utricularia.* Sepals subequal, not spreading, oblong-lanceolate to elliptic-lanceolate, acute, 3–6 mm. long and 1–2 mm. wide, the dorsal sepal free, concave, the laterals connate at the base and produced into a short, broad, obtuse sac. Petals subequal to the dorsal sepal, elliptic-ovate, acute, or obtuse and shortly apiculate, 2.5–5 mm. long and 1.5–3 mm. wide. Lip about twice as long as the sepals, 5–12 mm. long and 5–12 mm. wide, the apex broadly spreading, deeply emarginate and 2-lobed, contracted at the base into a fleshy, biauriculate claw which is adnate to the base of the column, the apex of the claw with 2 suborbicular, flattened calli. Column short, rather stout, without wings, about 2 mm. long, the base without a foot.

Mexico to Brazil and Paraguay; Florida; West Indies.

CANAL ZONE: vicinity Gamboa, 100 ft., *Dorothy Allen 4572.* PANAMÁ: hills east of Panama City, sea level, *Powell 181.*

A common epiphyte widely distributed throughout the lowlands of the American tropics and sub-tropics. The species is very variable in regard to the size of flowers and width of leaves.

70. RODRIGUEZIA Ruiz & Pavon

Rodriguezia Ruiz & Pavon, Fl. Peruv. & Chil. Prodr. 115, *t. 25.* 1794; Benth. & Hook. Gen. Pl. 3:559. 1883.

Burlingtonia Lindl. in Bot. Reg. 23: *t. 1927.* 1837.
Physanthera Bert. ex Steudel, Nom. ed. 2, 2:330. 1841, nom. nud.

Epiphytic herbs with short, ovoid or elliptic-oblong, compressed, 1- to 2-leaved pseudobulbs distantly inserted on an elongate rhizome, or approximate, usually almost completely hidden by the conduplicate, imbricating bases of 2 to several conspicuous, foliaceous bracts. Leaves of the apex of the pseudobulbs and the blades of the foliaceous bracts coriaceous, ligular to elliptic-lanceolate, obtuse to

acute, or unequally emarginate. Inflorescences 1 to several simple, erect or deflexed racemes, produced from the axils of the foliaceous bracts. Flowers few to many, of moderate size to relatively large and conspicuous. Sepals usually dissimilar, the dorsal sepal free, concave and petaloid, the laterals usually connate for their entire length, forming a single conduplicate segment below the lip, often strongly geniculate or gibbose when seen in profile, or rarely connate for only about half their length, with the acute apices spreading. Petals subequal to the dorsal sepal. Lip usually exceeding the sepals, the base clawed, continuous with the base of the column and produced into a short spur or gibbose projection which is appressed to the ovary, the claw parallel with the column, the free limb spreading, obovate or obcordate, the disk often cristate. Column erect, slender, subcylindric, the apex dilated or subclavate, often with variously shaped arms or auricles, the base without a foot. Anther terminal, operculate, incumbent, 1-celled; pollinia 2, waxy.

A small genus of attractive tropical American epiphytes, ranging from Costa Rica to Peru and Brazil. Two species are known from Panama.

a. Inflorescences erect, equaling or exceeding the leaves. Sepals about 1 cm. long..... 2. R. SECUNDA
aa. Inflorescences deflexed, not equaling the leaves. Sepals about 2.5 cm. long..... 1. R. COMPACTA

1. RODRIGUEZIA COMPACTA Schltr. in Fedde, Rep. Sp. Nov. Beih. 19:144. 1923.

Epiphytic herbs with oblong-elliptic, compressed, monophyllous pseudobulbs 1.5–2.5 cm. long and 1.0–1.5 cm. wide, nearly hidden by the conduplicate imbricating bases of several conspicuous, foliaceous bracts. Leaves from the apex of the pseudobulbs and the blades of the foliaceous bracts oblong-ligular to ligular, coriaceous, the apices obtuse or obscurely emarginate, 6–14 cm. long and 1.5–2.5 cm. wide. Inflorescences 1–2 lax, slender, deflexed, few-flowered racemes 3–4.5 cm. long. Flowers of moderate size, conspicuously larger than those of *Rodriguezia secunda*, pale yellow or greenish yellow with a yellow lip. Sepals dissimilar, the dorsal sepal narrowly oblong, obtuse, concave, about 2.5 cm. long, the laterals connate for their entire length, forming a single conduplicate segment below the lip, about 2.6 cm. long, the apex shortly bifid, the base geniculate in profile. Petals obliquely oblong, obtuse, about 2.5 cm. long. Lip adnate to the foot of the column, about 2.5 cm. long and 1 cm. wide, the free limb obovate-spatulate, the apex deeply emarginate and 2-lobed, the mid-nerve thickened and projecting between the apical lobes as a short apicule, the base produced into a short, curved, subulate spur. Column subcylindric, the apex dilated and subclavate, with projecting arms, the basal half minutely puberulent, the base without a foot.

Costa Rica and Panama.

BOCAS DEL TORO: Río Cricamola, between Finca St. Louis and Konkintöe, about 10–50 m., *Woodson 1888*.

An apparently attractive species, readily separable from the common *Rodriguezia secunda* by the short, deflexed inflorescences and the relatively large, greenish white or pale yellow flowers.

2. RODRIGUEZIA SECUNDA HBK. Nov. Gen. & Sp. 1:367, *t. 92.* 1816.

Pleurothallis coccinea Hook. Exot. Fl. 2: *t. 129.* 1815.
Rodriguezia lanceolata Lodd. Bot. Cab. *7*: *t. 676.* 1822, non *R. lanceolata* R. & P.
Rodriguezia secunda HBK. var. *panamensis* Schltr. in Fedde, Rep. Sp. Nov. Beih. 17:75. 1922.

Erect, epiphytic herbs with oblong-elliptic, compressed, monophyllous pseudobulbs 2–3.5 cm. long and 1.0–1.6 cm. wide, almost completely covered by the conduplicate, imbricating bases of the 4–7 conspicuous, foliaceous bracts. Leaves of the apex of the pseudobulbs and the blades of the foliaceous bracts coriaceous to rather fleshy, linear-ligular to elliptic-oblong, obtuse, subacute or unequally emarginate at the apex, 7–24 cm. long and 1–3.5 cm. wide. Inflorescences 1–6 erect or arching, unbranched, unilateral racemes 15–38 cm. tall. Flowers many, rather small, pink to rose-red. Sepals dissimilar, not spreading, the dorsal sepal concave, ovate, obtuse with a minute apicule, or subacute, 9–12 mm. long and 5–6 mm. wide, the lateral sepals connate for their entire length, forming a single, conduplicate segment below the lip, 10–15 mm. long, the base conspicuously gibbose or geniculate when seen in profile. Petals obovate, shortly acute or apiculate, 9–12 mm. long and 6–7 mm. wide. Lip entire, obscurely clawed, the biauriculate claw adnate to the base of the column and produced into a very short spur, the free limb oblong-obovate, with undulate margins, 12–15 mm. long and 5–7 mm. wide, the apex deeply emarginate and 2-lobed, the disk with a prominent fleshy bicarinate callus. Column subcylindric, the apex rather dilated and subclavate, with 2 short projecting teeth on the under-side.

Panama, Colombia, Venezuela, British Guiana, Surinam, and Trinidad.

CANAL ZONE: vicinity Frijoles, sea level, *Powell 3184;* along Río Chagres, between Gamboa and Alahuela, 30–60 m., *Allen 962;* Gatún Lake, sea level, *Powell s. n.* PANAMÁ: hills east of Panama City, *Powell s. n.;* vicinity Paja, near Empire, sea level, *Powell 3194;* vicinity Juan Mina, Río Chagres, 100 ft., *Allen & Allen 4133.* COLÓN: Cativo-Porto Bello trail, sea level, *Powell s. n.*

71. TRIZEUXIS Lindl.

TRIZEUXIS Lindl. Collect. Bot. *t. 2.* 1823; Benth. & Hook. Gen. Pl. 3:566. 1883.
Trixeuxis Lindl. Orch. Sel. 15. 1826.

Small epiphytic herbs with short, distichous, foliaceous stems, the imbricating leaf bases distichously arranged in the form of an open fan and usually enveloping a small, monophyllous pseudobulb. Leaves falcate to gladiate, acute. Inflorescences paniculate scapes produced from the bases of the pseudobulbs and conspicuously exceeding the leaves. Flowers subglobose, minute, in dense racemes terminating the branches of the panicle. Sepals dissimilar, of about equal length, the dorsal sepal arching, deeply concave, the laterals connate for nearly their entire length, forming a single bifid segment below the lip. Petals elliptic-ovate, obtuse or subacute, about as long as the sepals. Lip entire, concave, articulated with the

base of the column, the lateral margins erect and parallel with the column, the apex rather fleshy and recurved. Column subcylindric, erect, the base without a foot. Anther terminal, operculate, incumbent, 1-celled; pollinia 2, waxy.

Two or three species of small American epiphytes ranging from Costa Rica to Trinidad, Brazil, Bolivia, and Peru. One species is known from Panama.

1. TRIZEUXIS FALCATA Lindl. Collect. Bot. *t. 2.* 1823.

Trizeuxis andina Schltr. in Fedde, Rep. Sp. Nov. Beih. 10:52. 1922.

Small to minute, erect, epiphytic herbs 2.5–10 cm. tall, with short, distichous, foliaceous stems, the imbricating leaf bases usually enveloping a small, subquadrate, compressed, monophyllous pseudobulb. Leaves falcate or gladiate, acute or acuminate, the complanate blades 1.5–8 cm. long and 0.3–1.0 cm. wide, the imbricating bases distichously arranged in the form of an open fan. Inflorescences slender, erect, paniculate scapes 3–20 mm. long, produced from the bases of the pseudobulbs, conspicuously exceeding the leaves. Flowers subglobose, minute, in dense, subcapitate or elongate racemes terminating the branches of the panicle. Sepals dissimilar, of about equal length, green or pale yellow, the dorsal sepal ovate, acute, arching and deeply concave, about 2 mm. long, the laterals connate for nearly their entire length, forming a single obovate, bifid segment about 2 mm. long below the lip. Petals elliptic-ovate, obtuse or subacute, about as long as the sepals. Lip entire, lanceolate, acute, about 2.5 mm. long, the base concave, the lateral margins erect and closely appressed to the sides of the column, the apex rather fleshy and recurved, ovate, acute, yellow or orange, about ⅓ the total length of the lip. Column short, stout, subcylindric, about 1 mm. long, the apex somewhat dilated, the base without a foot. Anther very large in proportion to the size of the flower, about 1.2 mm. long.

Costa Rica, Panama, Venezuela, Trinidad, Brazil, Bolivia, and Peru.

VERAGUAS: vicinity Santiago, 700 ft., *Powell 3526.* CHIRIQUÍ: vicinity Concepción, 800 ft., *Powell 286.*

72. TRICHOPILIA Lindl.

TRICHOPILIA Lindl. Nat. Syst. Bot. ed. 2, 446. 1836; Benth. & Hook. Gen. Pl. 3:559. 1883.

Pilumna Lindl. in Bot. Reg. n. s. *7*: Misc. *73.* 1844.
Helcia Lindl. loc. cit. 8: Misc. 17. 1845.
Leucohyle Klotzsch, in Ind. Sem. Hort. Bot. Berol. App. 1. 1854.
Trichophila Pritz. Icon. Bot. Ind. 1115. 1855, sphalm.

Erect epiphytic herbs with approximate monophyllous pseudobulbs. Leaves subcoriaceous to coriaceous or sometimes fleshy, usually elliptic-lanceolate to ligular, rarely narrowly linear or semiterete. Inflorescences slender, short or elongate, erect, arching or pendulous, 1- to 7-flowered scapes produced from the bases of the pseudobulbs. Flowers usually large and attractive. Sepals narrow,

widely spreading, often twisted, usually subequal and free, the laterals sometimes connate at the base, rarely as far as the middle. Petals subequal to the dorsal sepal. Lip entire or 3-lobed, clawed at the base and adnate to the base of the column, the limb spreading or the lateral lobes convolute and forming a tube, the mid-lobe spreading, the disk smooth or lamellate. Column erect, semiterete, the margins of the apex projecting, entire or lobed, usually dentate or fimbriate, the base of the column without a foot. Anther terminal within the clinandrium, operculate, incumbent, 1-celled; pollinia 2, waxy.

A small genus of tropical American epiphytes ranging from southern Mexico to Peru, Brazil, and the West Indies. It is another of the frequently recurring and perplexing instances in which the specific concepts within the genus are by no means of equal value. In this case there are several groups of closely related entities, each group centering on an archetypal species, and more closely related to it, and each to the other, than to other similar groups within the genus. For example, *Trichopilia subulata* is obviously closely allied to, if not actually identical with *T. mutica;* and both markedly distinct from the archetype *T. suavis*, and its associate *T. leucoxantha*, or from the archetype *T. tortilis*, with its closely allied species *T. marginata, T. maculata, T. turialbae, T. Galeottiana*, etc. Due to the lack, in most instances, of types or adequate series upon which to base comparative studies, I hesitate at this time to undertake any such wholesale overhauling of names as would seem to be required on the basis of probable relationships. The present treatment, for the most part, follows established usage, but it is to be expected that many of these minor concepts may ultimately be reduced to varietal status or synonymy. At the present time six separable specific concepts are represented in Panama.

a. Pseudobulbs subcylindric. Leaves fleshy, narrowly linear to semiterete, 10 mm. wide or less. Lip not tubular ..... 5. T. SUBULATA
aa. Pseudobulbs ancipitous, linear to suborbicular. Leaves coriaceous to subcoriaceous, ligular to elliptic-lanceolate, 15 mm. wide or more. Lip tubular.
  b. Pseudobulbs linear, usually more than 4 times as long as broad.
    c. Lateral sepals connate to about the middle ..... 6. T. TURIALBAE
    cc. Lateral sepals not connate at the base ..... 3. T. MARGINATA
  bb. Pseudobulbs elliptic-oblong to suborbicular, less than 3 times as long as broad.
    c. Leaves 2–3.5 cm. wide. Basal imbricating bracts of the pseudobulbs conspicuously maculate. Scapes 1-flowered, the inner lip with an inconspicuous keel not equaling the column in length ..... 2. T. MACULATA
    cc. Leaves 4–7 cm. wide. Basal imbricating bracts of the pseudobulbs not maculate. Scapes several-flowered, the inner lip with a prominent central keel equaling or exceeding the column in length.
      d. Sepals 2.5–3.5 cm. long ..... 1. T. LEUCOXANTHA
      dd. Sepals 4–6 cm. long ..... 4. T. SUAVIS

1. TRICHOPILIA LEUCOXANTHA L. Wms. in Am. Orch. Soc. Bull. 10:137. 1941.

Erect, epiphytic herbs 20–25 cm. tall, with approximate, elliptic-oblong to suborbicular, compressed, monophyllous pseudobulbs 2.5–4.5 cm. long and 2–3.5 cm. wide, the bases enveloped in several thin, papery, imbricating bracts which

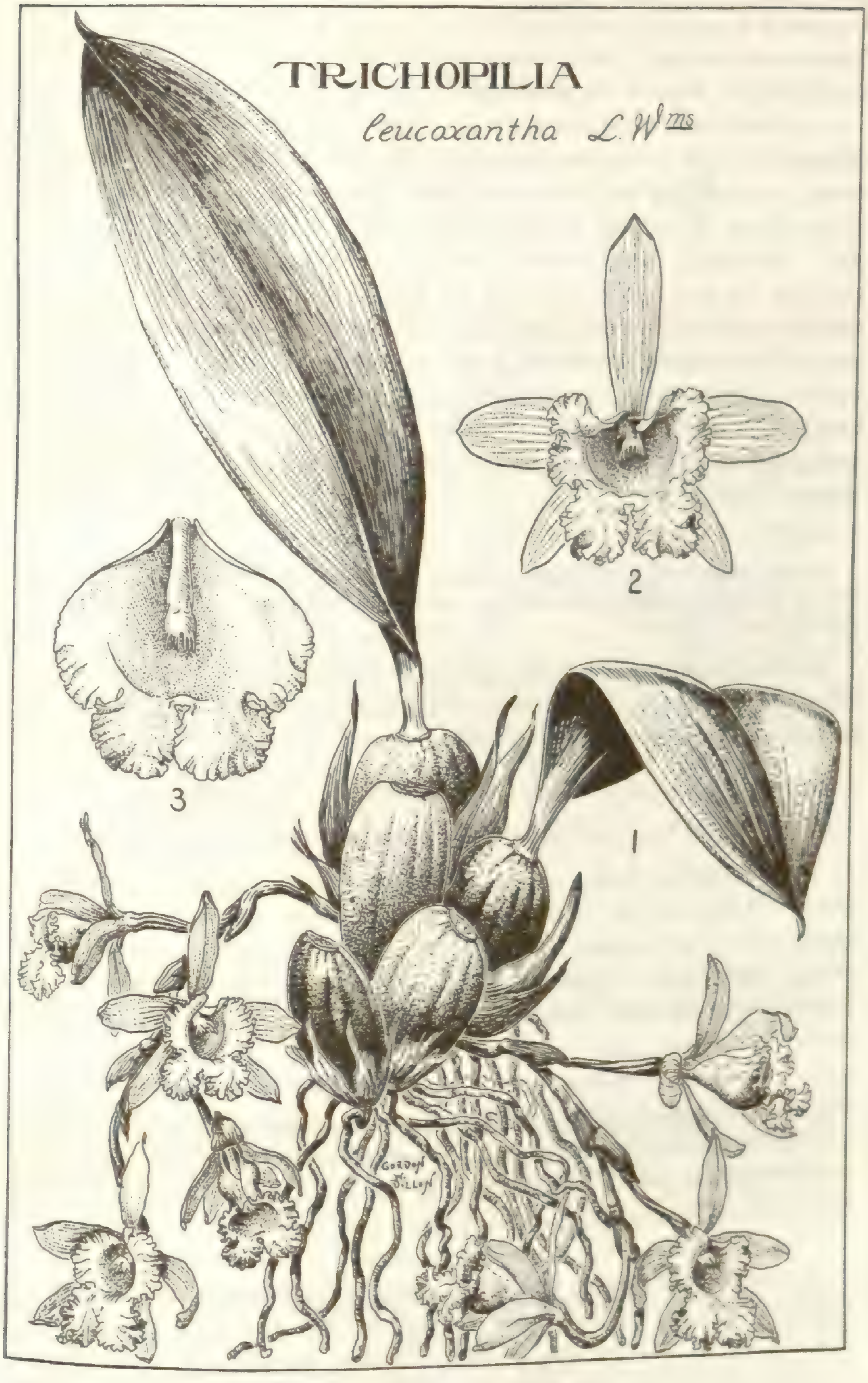


Fig. 188. *Trichopilia leucoxantha*

soon weather away. Leaves elliptic-lanceolate, acute, subcoriaceous, 15–20 cm. long and 4–6 cm. wide, contracted at the base into a short, conduplicate petiole. Inflorescences arching or pendulous, 1- to 4-flowered scapes 5–7 cm. long, produced from the bases of the pseudobulbs. Flowers of moderate size, white with a pale yellow blotch at the base of the lip. Sepals free, spreading, the dorsal sepal oblanceolate, acute, 2.5–3.5 cm. long and 0.7–0.8 cm. wide, the laterals lanceolate, acute, 2.5–3 cm. long and 0.6–0.8 cm. wide. Petals subequal to the dorsal sepal, elliptic-oblong, obtuse with a minute apicule, 2.5–3.2 cm. long and 0.9–1.0 cm. wide. Lip 3-lobed, broadly obovate when spread out, 3–3.5 cm. long and 3–3.5 cm. wide, the narrow base adnate to the base of the column, the lateral lobes rounded, incurving over the column, the anterior margins more or less undulant, the mid-lobe spreading or reflexed, deeply emarginate, the lateral lobules strongly undulate, the disk with a prominent central keel about equaling the column in length. Column slender, terete, 15–18 mm. long, the margins of the apex projecting and forming a fimbriate hood over the anther, the base of the column without a foot.

Panama.

COCLÉ: western slope and summit of Cerro Valle Chiquito, 700–800 m., *Seibert 515;* vicinity El Valle de Antón, 600–1000 m., *Allen 2401, 3564;* floor of El Valle, 600 m., *Fairchild s. n.*

Thus far known only from the region of El Valle de Antón, in Coclé Province. The plants considerably resemble those of *Trichopilia suavis*, and may possibly represent only a small-flowered variety of that species.

2. TRICHOPILIA MACULATA Rchb. f. in Bonplandia 3:215. 1855.

Trichopilia Powellii Schltr. in Fedde, Rep. Sp. Nov. Beih. 17:77. 1922.

Dwarf, epiphytic herbs; pseudobulbs elliptic-oblong, strongly ancipitous, 1-leaved, 2–5 cm. long and 1.5–2.5 cm. wide, approximate and inserted at an acute angle on the short rhizome, the bases enveloped in several densely spotted, imbricating, papery bracts. Leaves elliptic-lanceolate, acute, subcoriaceous, 5–12 cm. long and 2–3.5 cm. wide. Inflorescences usually solitary, slender, arching or semipendulous 1-flowered scapes 4–6 cm. long, produced from the bases of the pseudobulbs. Flowers of moderate size. Sepals subequal, free, widely spreading, lanceolate, acuminate, often somewhat twisted, pale yellow or greenish yellow, 3–4 cm. long and 0.35–0.5 cm. wide. Petals subequal to the sepals, lanceolate, acuminate, pale or greenish yellow, about 3.5 cm. long and 0.5–0.6 cm. wide, often with undulant margins. Lip obscurely 3-lobed, obovate when spread out, about 3.5 cm. long and 1.6–1.8 cm. wide, contracted at the base and adnate to the base of the column, white, aging pale yellow, the inner lip yellow with numerous fine orange-red lines, the rounded lateral margins convolute, forming a tube, the mid-lobe emarginate, with spreading or reflexed lobules, the disk with a short, inconspicuous, central keel not equaling the column in length. Column slender,

Fig. 189. *Trichopilia maculata*

semiterete, the margins of the apex distinctly 3-parted and minutely denticulate, forming a hood over the anther.

Panama.

CANAL ZONE: vicinity Salamanca Hydrographic Station, upper Madden Lake region, 70–80 m., *Dodge, Steyermark & Allen s. n.*; Balboa, sea level, *Powell 3422*; drowned forest along Río Chagres, Madden Lake region, 66 m., *Steyermark & Allen 16770*; Barro Colorado Island, Gatún Lake, *Shattuck 555*; San Jose Island, Perlas Archipelago, *Johnston 148, 1276*. PANAMÁ: hills near Panama City, *Powell 3096*; Orange River valley, 75 m., *Killip 3247*; vicinity La Chorrera, 20 m., *Allen 2842*; Río La Maestra, 0–25 m., *Allen 51*.

Small, but attractive plants fairly frequent in the lowlands of the central and eastern Isthmian area. The species apparently is confined to Panama. Guatemalan specimens identified as this species seem more readily referable to the Mexican *T. tortilis*.

3. Trichopilia marginata Henfr. in Gard. Mag. Bot. 3:185. 1851.

Trichopilia coccinea Warscz. in Paxton's Flow. Gard. 2:79. 1851-52.
Trichopilia crispa Lindl. in Gard. Chron. 342. 1857.
Trichopilia lepida Hort. ex Flor. Mag. n. s. *t. 98*. 1874.

Erect, epiphytic herbs with approximate, linear, broadly truncate, strongly ancipitous, 1-leaved pseudobulbs 6–14 cm. long and 1–2.5 cm. wide, the bases enveloped in several imbricating, papery, usually conspicuously maculate sheaths. Leaves elliptic-lanceolate to lanceolate, acute to acuminate, coriaceous, 12–30 cm. long and 3–5.5 cm. wide, contracted at the base into very short, conduplicate petioles. Inflorescences short, arching or pendulous, 2- to 3-flowered scapes produced from the bases of the pseudobulbs. Flowers large and conspicuous, very variable in color, most frequently with the sepals and petals reddish with lighter margins, the lip usually white on the outer surface, rarely red, the inner tube a deep rose-red, the reflexed margins of the mid-lobe often margined white. Sepals narrow, subequal, free, widely spreading, lanceolate to oblanceolate, acute, usually not twisted but sometimes with undulant margins, 4.5–6 cm. long and 0.6–1.0 cm. wide. Petals subequal to the sepals, spreading, oblanceolate, acute, 4–5.5 cm. long and 0.8–1.2 cm. wide, often with undulant margins. Lip tubular at the base, the apex obovate when spread out, 5–8 cm. long and 4–5 cm. wide, the narrow base adnate to the base of the column, the lateral lobes rounded and convolute forming a tube, the mid-lobe deeply emarginate, the lateral lobules spreading or recurved, with undulant margins, the disk without a prominent keel. Column terete, the margins of the apex projecting, forming an obscurely 3-lobed, fimbriate hood over the anther.

Guatemala, Costa Rica, Panama, and Colombia.

Chiriquí: Caldera River flats, 3800 ft., *Powell 3333;* without definite locality, 4000 ft., *Powell 154, 3291;* forests around El Boquete, 1000–1300 m., *Pittier 2969;* in heavy forest along road below El Hato, s. w. slopes of Chiriquí Volcano, 3800 ft., *Allen s. n.*

A large-flowered, attractive species first collected by von Warscewicz in 1849 on the slopes of Chiriquí volcano and introduced into cultivation under the name of *Trichopilia coccinea.* The plants are fairly common in heavy forest at 3500–5500 ft. elevation, growing usually in dense shade on the lower trunks of the trees. They are strikingly similar to the earlier *T. tortilis* of Mexico and Guatemala, and it seems very probable that our plants represent at most a somewhat more robust variety of that species.

There are several well-marked color forms, of which the following are recorded from Panama.

Trichopilia marginata var. alba Rchb. f.

Flowers pure white, the inner lip lemon-yellow.

Trichopilia marginata var. lepida Veitch, Man. Orchid. Pl. 2^9:183. 1893.

Flowers somewhat larger than in the type; the sepals and petals blotched rose-

pink, as is also the frontal lobe of the lip; the sepals and petals with very broad white margins.

Fig. 190. *Trichopilia suavis*

Trichopilia marginata var. olivacea Rchb. f. Beitr. Orch. Centr.-Amer. 13. 1866.

Sepals and petals olive-green.

4. Trichopilia suavis Lindl. & Paxton in Paxton's Flow. Gard. 1:44. 1850-51.

Trichopilia Kienastiana Rchb. f. in Gard. Chron. n. s. 20:166. 1883.

Erect, epiphytic herbs with approximate, rather fleshy, oblong-ovoid, elliptic or suborbicular, laterally compressed, monophyllous pseudobulbs 3.5–8 cm. long and 2.5–6 cm. wide, the bases enveloped in several thin, papery, imbricating bracts which soon weather away. Leaves elliptic-lanceolate, acute, subcoriaceous, 10–40 cm. long and 3.5–8 cm. wide, contracted below into short or elongate, conduplicate petioles. Inflorescences short, arching or pendulous, 2- to 5-flowered scapes produced from the bases of the pseudobulbs. Flowers large and attractive, fragrant, the sepals and petals white or creamy white sometimes spotted with pale rose-pink or red, the lip white or creamy white usually heavily spotted rose-pink, the inner tube most frequently with yellow or orange markings, very rarely blotched red. Sepals subequal, free, widely spreading, usually with undulate margins, lanceolate, acute, with a central thickened nerve or keel on the dorsal surface, 3–5.5 cm. long and 0.6–1.0 cm. wide, the lateral sepals rarely somewhat connate at the very base. Petals subequal to the sepals, lanceolate, shortly acute, with undulate margins, 2.8–5 cm. long and 0.8–1.2 cm. wide. Lip tubular, 3-lobed, obovate when spread out, 4.5–6.5 cm. long and 3–5 cm. wide, the narrow base adnate to the base of the column, the rounded lateral lobes convolute forming a tube, the anterior margins usually crisped and undulate, the mid-lobe retuse or emarginate, the lobules undulate, crisped and reflexed, the disk with a prominent, erect, central keel exceeding the column in length. Column elongate, terete, the margins of the apex projecting, forming a conspicuous, fimbriate, obscurely 4-lobed hood over the anther.

Costa Rica, Panama, and Colombia.

Chiriquí: without definite locality, 4000–5500 ft., *Powell 135, 3334, 3342, 3348*; Llanos on southwest slope of Chiriquí Volcano and along Río Chiriquí Viejo, 1200 m., *Allen 912*.

This is one of the most attractive species of the genus. It was first discovered by von Warscewicz in 1848, very probably in Costa Rica; but by far the finest forms have been found on the slopes of Chiriquí volcano in Panama, where they are fairly common in low mossy woods at 3800–5500 ft. elevation. The fragrant flowers are variable in color, a pure white form being rather frequent. They are usually produced in March and April.

5. Trichopilia subulata (Sw.) Rchb. f. in Flora 48:278. 1865.

Epidendrum subulatum Sw. Prodr. 123. 1788.
Cymbidium subulatum Sw. in Nov. Act. Soc. Upsal. 6:73. 1799.
Leucohyle Warscewiczii Kl. in Ind. Sem. Hort. Bot. Berol. App. 1. 1854.

Fig. 191. *Trichopilia subulata*

Trichopilia hymenantha Rchb. f. in Bonplandia 2:90. 1854.
Trichopilia jamaicensis Fawc. & Rendle, in Jour. Bot. 48:107. 1910.
Leucohyle subulata (Sw.) Schltr. Die Orchideen, 469. 1914.

Small, caespitose, epiphytic herbs 10–25 cm. tall, with short, inconspicuous, approximate, subcylindric, monophyllous pseudobulbs 1–2.5 cm. long and 0.2–0.5 cm. wide, the bases enveloped in several brown, papery, imbricating sheaths. Leaves fleshy, linear-lanceolate to semiterete, acuminate, 9–22 cm. long and 0.3–1.0 cm. wide, contracted at the base and apparently continuous with the apices of the slender pseudobulbs. Inflorescences pendulous, unbranched racemes 2.5–6 cm. long, produced from the bases of the foliaceous stems. Flowers small for the genus, usually 3–8, on slender pedicels, each subtended by a broad, acute to acuminate, spathaceous, papery bract. Sepals subequal, free, spreading, pure white to pale yellow, linear-lanceolate, acuminate, 20–23 mm. long and 3–4 mm. wide.

Petals subequal to the sepals, spreading, linear-lanceolate, acuminate, pure white to pale yellow, 18–20 mm. long and 2.5–3 mm. wide. Lip entire to obscurely 3-lobed, concave, obovate to elliptic-oblong, abruptly acute, or obtuse and apiculate, the margins minutely denticulate to conspicuously lacerate, white, usually irregularly spotted rose-purple, 15–20 mm. long and 12–18 mm. wide, the base adnate to the base of the column, the lateral margins erect at the very base and somewhat incurving over the column, the limb spreading, the disk with a short, fleshy, bifid or bicarinate callus. Column semiterete, 7–9 mm. long, the margins of the apex projecting, forming an entire, denticulate to fimbriate hood over the anther, the sides of the clinandrium below the hood with a pair of short to elongate, denticulate processes.

Panama, Colombia, and Jamaica.

CANAL ZONE: Barro Colorado Island, Wheeler trail, *Shattuck 548;* Upper Chagres River, sea level, *Powell 241;* Cerro Campana, vicinity Campana, 3000 ft., *Allen 5142.* COCLÉ: hills north of El Valle de Antón, 1000 m., *Fairchild s. n.*

Small but attractive epiphytes, vegetatively reminiscent of a slender form of *Brassavola nodosa.* The flowers in the specimens examined are quite variable. In the El Valle and Cerro Campana collections the margins of the lip are conspicuously lacerate while in the lowland specimens they are only minutely denticulate; also, the lateral subulate processes on either side of the clinandrium have been found to be quite variable, scarcely any two specimens being exactly alike. The simpler of these forms very closely approximate the earlier South American *Trichopilia mutica,* and it seems quite probable that a more complete series of collections from the intermediate area would prove the two concepts to be one polymorphic species.

6. TRICHOPILIA TURIALBAE Rchb. f. in Hamb. Gartenzeit. 19:11. 1863, non Batem.

Erect, epiphytic herbs with approximate, linear, strongly ancipitous pseudobulbs 5.5–10 cm. tall and 1.2–1.8 cm. wide, the truncate apices with a single leaf, the bases of the pseudobulbs enveloped in several papery, imbricating bracts. Leaves elliptic-lanceolate, acute, subcoriaceous, 15–20 cm. long and 3.5–5 cm. wide. Inflorescences short, arching or pendulous, 1- to 3-flowered scapes produced from the bases of the pseudobulbs. Flowers of moderate size. Sepals spreading, pure white, 2.5–3 cm. long and 0.4–0.5 cm. wide, the dorsal sepal free, lanceolate, acute, the lateral sepals connate to about the middle, acuminate. Petals subequal to the dorsal sepal, pure white, lanceolate, acuminate, 2.5–3 cm. long and 0.6–0.8 cm. wide. Lip tubular, white with pale orange lines in the throat, obscurely 3-lobed, obovate when spread out, 3.5–4 cm. long and 2.5–3 cm. wide, the narrowed base adnate to the base of the column, the lateral margins convolute and enveloping the column, the mid-lobe retuse at the apex, the lateral lobules reflexed and undulate, the disk with an elongate, central keel exceeding the length of the

column. Column elongate, semiterete, the margins of the apex projecting and forming a distinctly 3-parted, minutely denticulate hood over the anther.

Costa Rica and Panama.

VERAGUAS: mountains of western Azuero, about 600 m., *E. R. Dunn s. n.*

Trichopilia turialbae Rchb. f. is very close to the earlier *T. tortilis*, differing in the smaller size and in color of the flowers, and in the conspicuously connate lateral sepals. However, several Guatemalan collections of *T. tortilis* have been examined in which the flowers closely approximate ours in size. In all the material seen of *T. tortilis*, the lateral sepals were found to be connate at the base in some degree, although none to the middle as in our specimens. It seems rather likely, however, that intermediate forms will eventually be found and that *T. turialbae* will be reduced to varietal status under the archetypal species.

73. MESOSPINIDIUM Rchb. f.

MESOSPINIDIUM Rchb. f. in Bot. Zeit. 10:929. 1852; Walp. Ann. 6:856. 1864.

Epiphytic herbs with slender, complanate, monophyllous pseudobulbs enveloped at the base in several conspicuous, foliaceous bracts. Leaves at the apex of the pseudobulbs and the blades of the foliaceous bracts ligular to elliptic-lanceolate, subcoriaceous to pergameneous, the conduplicate, imbricating bases of the foliaceous bracts forming a 2-ranked, more or less flabelliform cluster. Inflorescences slender, erect or arching panicles or racemes produced from the base of the current pseudobulb. Flowers small, on short, slender pedicels subtended by inconspicuous bracts. Sepals rather fleshy, not widely spreading, the dorsal sepal free, the laterals connate for more than half their length, forming a single bifid segment supporting the lip. Petals oblong, acute to cuneate and aristate, the broad bases inserted on the sides of the column. Lip entire, the base shallowly subsaccate and continuous with the base of the column, the limb oblong, obovate or subpandurate, the margins usually revolute, the apex acute to obtuse and emarginate, the disk with 2 fleshy, converging keels. Column short, very stout, apparently without wings or appendages, the base without a foot; pollinia 2, waxy.

Two or three species of tropical American epiphytes, apparently closely allied to *Oncidium* and *Odontoglossum*. One species is known from Panama.

1. MESOSPINIDIUM WARSCEWICZII Rchb. f. in Bot. Zeit. 10:929. 1852.

Solenidium Endresii Kränzl. in Engl. Pflanzenr. IV, Fam. 50 (Heft 80):317. 1922.

Erect, epiphytic herbs with distichous clusters of foliaceous bracts, the conduplicate bases somewhat enveloping a slender, strongly ancipitous, nearly linear, monophyllous pseudobulb, the plants 12–22 cm. tall. Leaves of the apex of the pseudobulbs and the blades of the foliaceous bracts ligular to elliptic-lanceolate, acute to acuminate, pergameneous, 5–17 cm. long and 1–2.8 cm. wide, contracted below into slender, conduplicate petioles, the persistent bases of the bracts often somewhat broader than the petioles, in dried specimens superficially resembling

the pseudobulbs. Inflorescences 1–2 slender, erect, racemose or paniculate scapes equaling or exceeding the leaves, 12–27 cm. tall, produced from the bases of the pseudobulbs. Flowers small. Sepals rather fleshy, not widely spreading, greenish yellow to tan, often spotted reddish brown, the dorsal sepal ovate, deeply concave, the apex conspicuously aristate, 6–8 mm. long and 2.5–3 mm. wide, the lateral sepals connate for more than half their length, forming a single bifid segment supporting the lip, 6–8 mm. long and 4–5 mm. wide. Petals rather fleshy, oblong-lanceolate, the apices aristate, the broad bases inserted on the sides of the column, the margins scarcely imbricating with those of the sepals, 4–5 mm. long and 2.5–3 mm. wide. Lip fleshy, entire, subpandurate when spread out, 5–7 mm. long and 2.5–3 mm. wide, white to pale yellow, usually with minute red spots, the oblong, subsaccate base continuous with the base of the column, the apex broader, with revolute margins, the disk with 2 converging fleshy keels. Column short, very stout, apparently without wings or appendages, about 4 mm. long and 4 mm. wide, the base without a foot.

Costa Rica and Panama.

PANAMÁ: Cerro Campana, vicinity Campana, in cloud forest near summit, 800–1000 m., *Allen 3966*. COCLÉ: vicinity El Valle de Antón, 650 m., *Fairchild s. n.*; hills north of El Valle de Antón, 1000 m., *Allen 2761, 2785*.

74. ODONTOGLOSSUM HBK.

ODONTOGLOSSUM HBK. Nov. Gen. & Sp. 1:350, *t.* 85. 1816; Benth. & Hook. Gen. Pl. 3:561. 1883.

Cuitlauzina La Llave & Lex. Nov. Veg. Descr. 2:32. 1825.
Cuitlanzina Lindl. Orch. Sel. 15. 1826.
Cuitlauzinia Rchb. Nom. 54. 1841.
Lichterveldia Lem. Illustr. Hortic. 2: *t.* 59. 1855.
Osmoglossum Schltr. in Orchis 10:162. 1916, as subgenus.

Epiphytic herbs with approximate or rarely distant, usually ovoid or elliptic-oblong, compressed, 1- to 3-leaved pseudobulbs, the bases enveloped in a few distichous, papery or foliaceous bracts. Leaves coriaceous or fleshy. Inflorescences produced from the bases of the pseudobulbs, sometimes short and 1-flowered, more frequently elongate, erect or arching, very rarely pendulous, few- to many-flowered racemes or panicles. Flowers usually large and conspicuous, but sometimes small. Sepals subequal, usually spreading, free or rarely with the lateral sepals united. Petals usually subequal to the dorsal sepal but sometimes broader. Lip 3-lobed or entire, the base continuous with the base of the column, the limb erect or parallel with the column, sometimes shortly adnate to it, the lateral lobes (if present) spreading or erect, the mid-lobe usually deflexed, less frequently spreading or concave, the apex acute, obtuse or emarginate, the disk at the base of the lip variously cristate, denticulate, lamellate, or rarely smooth. Column usually longer and more slender than in *Oncidium*, often clavate, the apex without appendages or sometimes with the margins produced into lobes, auricles, or teeth. Anther terminal, operculate, incumbent, 1-celled or imperfectly 2-celled; pollinia 2, waxy.

A large, polymorphic group of highland epiphytes having centers of rich specific and varietal development in the mountains of Mexico and Colombia, with some species ranging as far south as Brazil and Bolivia. As has been pointed out by Dr. Louis Williams in a footnote to the generic key (Ann. Mo. Bot. Gard. 33:7 [Fl. Pan. 3[2]:113]. 1946) the concepts of *Odontoglossum*, *Miltonia*, *Mesospinidium*, *Aspasia*, *Brassia*, *Leochilus*, and *Osmoglossum* are technically inseparable from that of the earlier *Oncidium*, and might much more logically be treated as subgeneric sections of that genus. However, the species in each category are generally sufficiently distinctive to be readily recognizable by the average amateur, only the border-line species presenting any great difficulty. Practical ends seem to be better served by the maintainance of these entities as distinct, particularly for a treatment of this type, with the single exception of *Osmoglossum*, which, it appears, was never properly described or published, having been listed by Schlechter merely as a subgenus. Five species have been known from Panama, and a sixth, *Odontoglossum convallarioides*, which is very common in the highlands of adjacent Costa Rica, may possibly be represented in our series of specimens by a single fragmentary collection.

a. Apex of the pseudobulbs monophyllous.
  b. Inflorescences racemose. Plants robust, the pseudobulbs distantly inserted on an elongate rhizome..... 2. O. CHIRIQUENSE
  bb. Inflorescences 1-flowered. Plants dwarf, the pseudobulbs approximate..... 5. O. OERSTEDII
aa. Apex of the pseudobulbs di- or triphyllous.
  b. Inflorescences paniculate..... 1. O. CARINIFERUM
  bb. Inflorescences racemose.
    c. Flowers small, sepals 15 mm. long or less. Leaves narrowly linear.
      d. Lateral sepals connate for more than half their length..... 4. O. EGERTONI
      dd. Lateral sepals not connate..... 3. O. CONVALLARIOIDES
    cc. Flowers large, sepals 30 mm. long or more. Leaves elliptic-lanceolate..... 6. O. SCHLIEPERIANUM

1. ODONTOGLOSSUM CARINIFERUM Rchb. f. in Bot. Zeit. 10:638. 1852.

Oncidium cariniferum (Rchb. f.) Beer, Prakt. Stud. Orch. 283. 1854.
Odontoglossum bastilabium Lindl. var. *fuscatum* Hook. in Bot. Mag. *t. 4919*. 1856.

Large, erect, epiphytic herbs with ovoid to elliptic-oblong, compressed, usually furrowed pseudobulbs 6–12 cm. long and 2.5–8 cm. wide, the apices with 2–3 leaves, the bases partially enveloped in several more or less distichous, imbricating bracts, the upper 2–3 of which are conspicuously foliaceous. Leaves coriaceous, linear-ligular, acute, 30–45 cm. long and 2.5–7 cm. wide. Inflorescences large, stout, erect or arching, many-flowered panicles, conspicuously exceeding the leaves, up to about 1 m. in length. Flowers relatively large, on long, slender pedicels, each subtended by an inconspicuous bract. Sepals subequal, usually free, spreading, brown, usually with yellow tips and margins, lanceolate, acuminate, somewhat concave, with a strongly developed dorsal keel, 2.5–3 cm. long and 0.4–0.6 cm. wide. Petals subequal to the sepals and similarly colored, lanceolate, acuminate, sometimes subfalcately incurving, 2–2.5 cm. long and 0.6–0.8 cm.

wide. Lip inconspicuously 3-lobed, 2–2.2 cm. long and 2–2.2 cm. wide, the much narrower basal half elliptic-oblong, adnate to the base of the column, the narrow lateral margins erect or spreading, the mid-lobe broadly biauriculate, white aging pale yellow, the apex very shortly acute or shallowly emarginate, with a short central apicule, the disk at the base of the lip often stained red, with 2 lateral subfalcate wings, the center with several projecting, fleshy teeth. Column slender, erect, about 10 mm. long, the ventral surface of the lower half conspicuously thickened, with 2 obscure lateral keels, terminating in 2 short, acute, fleshy wings below the stigma.

Costa Rica, Panama, Venezuela, and probably adjacent areas.

CHIRIQUÍ: without definite locality, 4000–5000 ft., *Powell 142*, *Kieswetter s. n.*; vicinity Cerro Punta, headwaters of the Río Chiriquí Viejo, 7000 ft., *Allen 1517*.

A robust species much resembling an Oncidium in vegetative habit, found in our area in Chiriquí Province, at 4000–7000 ft. elevation, where the plants seem to be confined to the tops of the tallest forest trees.

2. ODONTOGLOSSUM CHIRIQUENSE Rchb. f. in Bot. Zeit. 10:692. 1852.

Oncidium chiriquense (Rchb. f.) Beer, Prakt. Stud. Orch. 283. 1854.
Odontoglossum coronarium Lindl. Fol. Orch. Odontog. (21) No. 60. 1852.
Oncidium coronarium (Lindl.) Beer, Prakt. Stud. Orch. 285. 1854.

Robust, epiphytic herbs with stout, elongate, repent or semi-scandent rhizomes, the oblong-ovoid, compressed, monophyllous, usually dull purple pseudobulbs 7–11 cm. long and 4–6 cm. broad, distantly and obliquely inserted on the stems, the bases freely rooting, provided with 2–3 lateral, conspicuously foliaceous bracts, the long internodes completely enveloped in numerous papery, imbricating sheaths. Leaves and the blades of the foliaceous bracts elliptic-oblong, obtuse or retuse, coriaceous, 15–30 cm. long and 6–9 cm. wide, contracted at the base into short, conduplicate petioles. Inflorescences stout, erect, many-flowered racemes 30–45 cm. long. Flowers large and conspicuous, bright yellow richly blotched with reddish brown. Sepals free, subequal, widely spreading, elliptic-oblong to obovate, obtuse, with strongly undulate margins, 2–3 cm. long and 1.6–2 cm. wide. Petals subequal to the sepals and similarly colored, elliptic-oblong to obovate, obtuse to subacute, with strongly undulate margins, 2–3 cm. long and 1.5–1.8 cm. wide. Lip 3-lobed, subpandurate, 1.8–2.5 cm. long, the basal half conspicuously narrower than the apex and shortly adnate to the base of the column, the small lateral lobes erect, rather obliquely auriculate, obtuse, with undulate margins, the mid-lobe broadly spreading or reflexed, obovate, the apex obtuse or emarginate, the disk tuberculate at the base. Column short, stout, somewhat arcuate, 8–10 mm. long, the margins of the apex membranaceous and spreading.

Costa Rica, Panama, Colombia, Peru, and probably adjacent territories.

VERAGUAS: "Wild in Veragua; on the Cordillera of Chiriquí, at the height of 9000 ft., on decayed tree trunks. Flowers in October." *von Warczewicz.*

The type collection of this large-flowered and handsome species was presumably made in Panama, but it has not been found in recent years in our area, although it is fairly well known from adjacent Costa Rica and Colombia. It is often listed in horticultural publications as a variety of *Odontoglossum coronarium*. The reason for such treatment is a bit obscure, since Lindley, on the page following the type description of the latter species (Folia Orchidacea. Odontog. (22) No. 62. 1852), cites the place and date of the prior publication of *O. chiriquense*.

3. ODONTOGLOSSUM CONVALLARIOIDES (Schltr.) Ames & Correll, in Bot. Mus. Leafl. Harv. Univ. 11:19. 1943.

Osmoglossum convallarioides Schltr. in Fedde, Rep. Sp. Nov. Beih. 19:148. 1923.

Slender, erect, epiphytic herbs 30–45 cm. tall, the plants nearly identical with those of *Odontoglossum Egertoni*. Flowers fragrant, white, sometimes tinged with pink or lavender, the disk of the lip usually yellow. Sepals free, subequal, somewhat spreading, elliptic-oblong, acute or subacute, concave, 7–10 mm. long and 3–6 mm. wide. Petals broader than the sepals, obovate to suborbicular, obtuse or minutely apiculate, 6–9 mm. long and 5–7 mm. wide. Lip obscurely 3-lobed, obovate, the apex subacute to obtuse or emarginate, 8–10 mm. long and 6–8 mm. wide, the lateral lobules spreading or semi-erect, the mid-lobe usually concave, the disk with two short keels, produced at the front into 2 erect, incurving, parallel, approximate, denticulate processes, the central area below the base of the column with a low, narrow, cuneate callus. Column short, very stout, about 3 mm. long and 3 mm. wide, the apex with obscure, subentire, membranaceous lobules surrounding the clinandrium, the base without a foot.

Mexico, Guatemala, Honduras, Costa Rica, and probably Panama.

A widespread Central American highland species, very closely allied to *Odontoglossum pulchellum*, but differing in the much smaller flowers, the concave rather than arcuate-deflexed lip, and in the less conspicuous lobules surrounding the clinandrium. Although there are no authentic records to substantiate its occurrence in Panama, one fragmentary collection (*Woodson, Allen & Seibert 875*) looks rather suspiciously like it, and in any event its frequent occurrence in the adjacent Costa Rican highlands would strengthen the probability that it will ultimately be found in Chiriquí.

4. ODONTOGLOSSUM EGERTONI Lindl. in Bot. Reg. n. s. 8: Misc. 50. 1845.

Osmoglossum Egertoni (Lindl.) Schltr. in Orchis 10:166. 1916, in synon.
Osmoglossum acuminatum Schltr. in Fedde, Rep. Sp. Nov. Beih. 17:79. 1922.
Osmoglossum anceps Schltr. loc. cit. 19:147. 1923.

Erect, epiphytic herbs with approximate, narrowly elliptic-oblong or ovoid, tapering, compressed, often ridged, 2- to 3-leaved pseudobulbs 3.5–10 cm. long and 1.5–2.2 cm. wide, the bases partially enveloped in 2–3 distichous, conspicuously foliaceous bracts. Leaves and the blades of the basal bracts usually rather rigidly erect, narrowly linear-ligular, acute or acuminate, coriaceous, 25–45 cm.

long and 0.8–1.5 cm. wide. Inflorescences erect, few-flowered racemes, usually not equaling the leaves, produced from the bases of the pseudobulbs, 20–30 cm. tall, the rachis conspicuously flattened, provided with a few, distant, complanate, conduplicate, acuminate bracts. Flowers small for the genus, white, the disk of the lip yellow with reddish spots. Sepals not widely spreading, lanceolate to elliptic-lanceolate, acute to shortly acuminate, concave, the dorsal sepal free, 1.2–1.5 cm. long and 0.4–0.6 cm. wide, the laterals united to beyond the middle, forming a single bifid segment below the lip, 1.3–1.5 cm. long and 0.6–0.8 cm. wide. Petals rather oblique, subequal to the dorsal sepal, ovate-elliptic, acute or shortly acuminate, 1–1.3 cm. long and 0.5–0.8 cm. wide. Lip entire, elliptic-oblong, acute or shortly acuminate, 10–12 mm. long and 6–7 mm. wide, somewhat concave or spreading, the apex sometimes reflexed, the disk with two low keels converging at the front and produced into 2 erect, parallel, fleshy teeth, the central area below the base of the column with a low, narrow, cuneate callus. Column very short, stout, 2–3 mm. long and 2–3 mm. wide, the apex with short, membranaceous, 3-parted, fimbriate to denticulate projections surrounding the clinandrium.

Mexico, Guatemala, Honduras, Costa Rica, and Panama.

CHIRIQUÍ: without definite locality, 6000 ft., *Powell 255*.

Our specimens have somewhat narrower sepals and petals, and a somewhat more acuminate lip than in the type, but otherwise do not differ in the presence or absence of any essential character. It seems possible that all of the species of this alliance will ultimately be reduced to sub-specific rank or synonymy under the two distinctive archetypes, O. *pulchellum* and O. *Egertoni*.

5. ODONTOGLOSSUM OERSTEDII Rchb. f. in Bonplandia 3:214. 1855.

Dwarf, erect, epiphytic herbs up to 22 cm. tall, with approximate, ovoid, usually somewhat compressed, monophyllous pseudobulbs 1–3 cm. long and 0.8–1.8 cm. wide, the bases enveloped in several thin, papery, imbricating, non-foliaceous bracts which soon weather away. Leaves linear-ligular to elliptic-lanceolate, acute, coriaceous, 5–18 cm. long and 0.8–3 cm. wide, contracted below into elongate, slender, conduplicate petioles. Inflorescences erect, slender, 1-flowered scapes equaling or exceeding the leaves, 5–15 cm. long, produced from the bases of the pseudobulbs. Flowers of moderate size, solitary, white, fragrant, the base of the lip with a golden-yellow blotch, the callus densely spotted orange. Sepals free, subequal, spreading, elliptic-oblong, obtuse to subacute, sometimes with a short apicule, 12–20 mm. long and 6–10 mm. wide. Petals subequal to the sepals or sometimes broader, oblong-obovate to elliptic-oblong, obtuse, 12–20 mm. long and 8–12 mm. wide. Lip obovate, shortly clawed at the base, the narrow claw adnate to the base of the column, the apex of the lip broadly spreading, deeply emarginate and 2-lobed, 1.5–2.5 cm. long and 1.5–2.5 cm. wide, the disk with a short, erect, subquadrate, bicarinate, fleshy callus, the center concave, the posterior margin

Fig. 192. *Odontoglossum Schlieperianum*

directly below the column minutely ciliate. Column short, stout, 5–7 mm. long, without wings or appendages, the base without a foot.

Costa Rica and Panama.

CHIRIQUÍ: Potrero Muleto to the summit of Chiriquí Volcano, 3500–4000 m., *Woodson & Schery 455;* Loma Larga to the summit, 2500–3380 m., *Woodson, Allen & Seibert 1030;* Casita Alta to Cerro Copete, 2300–3300 m., *Woodson & Schery 337;* without definite locality, 10,000 ft., *Davidson 1001;* summit of Cerro Copete, on dead branches in Ericaceous barrens, 9000 ft., *Allen 4905.*

A small but attractive species rather frequent on the highest slopes of Chiriquí Volcano at 7,000–10,000 ft. elevation. Descriptions in horticultural publications usually indicate that the scapes are 2- to 5-flowered, yet none of the fairly extensive series of specimens in the Ames Herbarium show this to be the case, all having solitary flowers, which has also been the writer's observation in the field in the Chiriquí highlands and in Costa Rica. It seems possible that the plant illustrated in the 'Botanical Magazine' (*t. 6820*) under the name of *Odontoglossum Oerstedii* may be a white-flowered form of *O. Krameri.*

6. ODONTOGLOSSUM SCHLIEPERIANUM Rchb. f. in Gard. Chron. 1082. 1865.

Odontoglossum Insleayi Bark. var. *macranthum* Lindl. Fol. Orch. Odontog. (4). 1852.
Odontoglossum Warscewiczii Bridges ex Stein, Orchideenb. 398. 1892.
Odontoglossum Powellii Schltr. in Fedde, Rep. Sp. Nov. Beih. 17:78. 1922.
Odontoglossum grande Lindl. var. *pallidum* Hort. ex. Sanders, Orchid Guide 313. 1927.

Erect, epiphytic or sometimes pseudoterrestrial herbs with approximate, fleshy, elliptic-oblong or ovoid, compressed, centrally ridged, grayish green, diphyllous pseudobulbs 4–12 cm. long and 2.5–5.5 cm. wide, the bases enveloped in several thin, papery, imbricating bracts which soon weather away. Leaves lanceolate to elliptic-lanceolate, acute, subcoriaceous, 10–30 cm. long and 3–7 cm. wide, contracted below into short or elongate, conduplicate petioles. Inflorescences stout, erect, 2- to 8-flowered racemes equaling or exceeding the leaves, 18–35 cm. long, produced from the bases of the pseudobulbs. Flowers large, yellow or greenish yellow, conspicuously barred and blotched with reddish brown. Sepals subequal, free, spreading, lanceolate, acuminate, 3–4.5 cm. long and 1–1.5 cm. wide. Petals broader than the sepals, oblong-oblanceolate, obtuse to subacute, 3–3.5 cm. long and 1.5–2 cm. wide. Lip obscurely 3-lobed, subpandurate when spread out, 2–3 cm. long and 1.0–1.5 cm. wide, the base contracted into a narrow claw which is adnate to the base of the column, the lateral lobes small, rounded or suborbicular, erect in natural position, the mid-lobe spatulate to obovate, obtuse or retuse, about ¾ the total length of the lip, the disk with a short, central keel, from the mid-section and apex of which are produced 2 pairs of short, spreading, fleshy auricles. Column short, about 10 mm. long, terete below, dilated above, with a slender, acuminate, incurving tooth on each side of the stigma.

Costa Rica and Panama.

CHIRIQUÍ: vicinity Casita Alta, Finca Lérida, eastern slopes of Chiriquí Volcano, 1500–2000 m., *Woodson, Allen & Seibert 790;* vicinity Boquete, 3800–5500 ft., *Pring s. n., Davidson 797;* without definite locality, "In gulch, in damp shady places," 3800 ft., *Powell 178;* valley of the upper Río Chiriquí Viejo, 1300–1900 m., *Seibert 227;* vicinity Paso Ancho, Bambito Woods, along Río Chiriquí Viejo, 4500–5000 ft., *Allen 54.*

A common species of the Chiriquí highlands, closely allied to *Odontoglossum grande* of Mexico and Guatemala.

75. ASPASIA Lindley

ASPASIA Lindl. Gen. & Spec. Orch. Pl. 139. 1833; Benth. & Hook. Gen. Pl. 3:560. 1883.

Trophianthus Scheidw. in Otto & Dietr. Allg. Gartenzeit. 12:218. 1844.

Epiphytic herbs with short, erect, approximate, usually complanate, cylindric stems conspicuously thickened above into compressed, 1- to 2-leaved pseudobulbs, the lower stems and bases of the pseudobulbs invested by the conduplicate, distichously imbricating bases of several conspicuous, foliaceous bracts. Leaves and bract blades coriaceous or subcoriaceous. Inflorescences 1–2 short, erect, few-flowered racemes or rarely 1-flowered scapes, not equaling the leaves, produced from the axils of the uppermost foliaceous bracts. Flowers relatively large to small. Sepals of about equal length, spreading, the dorsal sepal subequal to the petals, the bases of the 3 upper segments connivent and adnate to the column usually somewhat above the insertion of the free lateral sepals. Lip shortly and narrowly clawed at the base, the claw adnate to the lower half of the column, the free limb spreading or with the apical half somewhat porrect, obscurely 3-lobed, subpandurate, subquadrate, suborbicular or obovate, sometimes entire, the lateral lobes (if present) rather broad, subdistinct or confluent with the usually larger mid-lobe. Column erect, semiterete, sometimes somewhat arcuate, the lower half connate with the claw of the lip, the ventral surface below the stigma broadly or narrowly sulcate, the margins sometimes with 2 short, denticulate projections, the apex truncate or sometimes continued into a short membranaceous hood over the anther, the column otherwise wingless, the base without a foot. Anther terminal, operculate, incumbent, 2-celled; pollinia 2, waxy.

About ten species of tropical American epiphytes, ranging from Guatemala to Brazil. Two of these and one variety are thus far known from Panama.

a. Pseudobulbs monophyllous. Plants 25 cm. tall or less. Column less than 6 mm. long ..... 3. A. PUSILLA

aa. Pseudobulbs diphyllous. Plants more than 25 cm. tall. Column 1.5 cm. long or more.

b. Lateral sepals 1.5–2.2 cm. long, with broad transverse markings. Column with an elliptic depression below the stigma. Apical half of the lip porrect ..... 1. A. EPIDENDROIDES

bb. Lateral sepals 2.5 cm. long or more, with narrow longitudinal stripes. Column with a narrow linear groove below the stigma. Apical half of the lip not porrect ..... 2. A. EPIDENDROIDES var. PRINCIPISSA

Fig. 193. *Aspasia epidendroides*

1. ASPASIA EPIDENDROIDES Lindl. in Hook. Jour. Bot. 1:6. 1834.

Aspasia fragrans Kl. Ind. Sem. Hort. Bot. Berol. 12. 1852.
Odontoglossum Aspasia Rchb. f. in Walp. Ann. 6:851. 1861.

Erect, epiphytic herbs with linear to oblong-elliptic, laterally compressed, diphyllous, stipitate pseudobulbs 5–14 cm. long and 2–6 cm. wide, the more robust plants having one side of the pseudobulb flattened, while the other surface is conspicuously convex, the complanate-cylindric lower portions and bases of the pseudobulbs invested with several closely imbricating bracts, the uppermost 2–3 of which are distichously arranged and conspicuously foliaceous. Leaves lanceolate to ligular, acute, subcoriaceous, 10–28 cm. long and 1.5–5 cm. wide. Inflorescences 1–2 simple, erect, few-flowered racemes 9–25 cm. long. Flowers of moderate size, the sepals greenish with broad transverse bands of brown or brownish lavender, the petals pale lavender to greenish brown, the lip white, with conspicuous purple or lavender markings in the center, the disk yellow, the column and anther tinged with lavender. Sepals of about equal length, elliptic-obovate, shortly acute, the apex concave with a short fleshy apiculate keel or thickening on the dorsal surface, 1.3–2 cm. long and 0.7–1.0 cm. wide, the base adnate to the base of the column slightly above the insertion of the petals, the lateral sepals strongly reflexed, narrowly and somewhat obliquely oblanceolate, acute, 1.5–2.2 cm. long and 0.6–0.8 cm. wide, the dorsal surfaces thickened into short apiculate keels at the apices. Petals subequal to the dorsal sepal, elliptic-obovate, concave, 1.5–1.8 cm. long and 0.6–0.9 cm. wide, the apices thickened into short, acute keels on the dorsal surfaces. Lip clawed at the base, the claw adnate to the lower half of the column, the free limb abruptly deflexed, obscurely 3-lobed, subquadrate, 1.2–1.6 cm. long and 1.4–1.8 cm. wide, the basal and apical halves of about equal width, the lateral margins at the base spreading, the mid-lobe emarginate and 2-lobed, with a thickened central keel, usually more or less porrect, the disk with 2 narrow parallel keels about equaling the lateral lobes of the lip in length. Column semiterete, slightly arcuate, about 1.5 cm. long, with a narrowly elliptic concavity below the stigma.

Guatemala, Honduras, Nicaragua, Costa Rica, and Panama.

PANAMÁ: along road to Pacora, about 50 m., *Allen 822*. COCLÉ: mountains beyond La Pintada, 400–600 m., *Hunter & Allen 633*; Penonomé and vicinity, 50–1000 ft., *R. S. Williams 445*. VERAGUAS: vicinity Santiago, 600–800 ft., *Powell 3542*; vicinity Rio de Jesús, sea level, *Allen & Allen 4273*. CHIRIQUÍ: without definite locality, *Powell 3017*.

2. ASPASIA EPIDENDROIDES var. PRINCIPISSA (Rchb. f.) P. H. Allen, stat. nov.

Aspasia principissa Rchb. f. in Bot. Zeit. 10:367. 1852.
Aspasia Rousseauae Schltr. in Gartenfl. 71:76. 1922.

Epiphytic herbs often nearly identical to *Aspasia epidendroides*, but usually somewhat less robust and with larger flowers. Sepals subequal, spreading, lanceolate, acute to acuminate, pale green, longitudinally striped brown, the apices thickened and somewhat concave, usually 2.5–3 cm. long and 0.5–0.7 cm. wide,

Fig. 194. *Aspasia epidendroides* var. *principissa*

the dorsal sepal connivent at the base with the bases of the petals and adnate to the column somewhat above the insertion of the lateral sepals. Petals a little broader than the sepals, spreading, lanceolate, acute, 2.2–2.8 cm. long and 0.6–0.9 cm. wide. Lip narrowly clawed at the base, the claw adnate to the lower half of the column, the free limb abruptly deflexed, explanate, obscurely 3-lobed, subpandurate, 2–3 cm. long and 1.8–2.6 cm. wide, the basal half usually conspicuously broader than the apical half, the lateral lobes rounded and spreading, the mid-lobe emarginate, the lateral lobules somewhat undulate but never porrect, the disk with numerous radiating thickened nerves, the central 2 of

which are parallel and exceeding the others, about equaling the lateral lobes of the lip in length. Column semiterete, lightly arcuate, 1.8–2 cm. long, creamy white aging pale yellow, adnate to the claw of the lip for about half of its length, the ventral surface below the stigma with a narrow groove, the base of the column without a foot.

Costa Rica and Panama.

CANAL ZONE: wet forest bordering Gatún Lake, 30 m., *Killip 3447;* Culebra, 50–100 m., *Pittier 3396;* Cruces, sea level, *Powell 3108.* PANAMÁ: foothills near Panama City, sea level, *Powell 39;* Juan Díaz, sea level, *Powell 3038;* Chiva-Chiva, sea level, *Powell 3029;* Río La Maestra, Pacific coast between the Río Bayano and the Gulf of San Miguel, 0–25 m., *Allen 68;* San Jose Island, Perlas Archipelago, *Johnston 136, 702, 1015, 1288, Erlanson 199.* COLÓN: Quebrada Salamanca, upper Madden Lake region, 70 m., *Dodge, Steyermark & Allen 16990;* forests along the Río Boquerón, above the Peluca Hydrographic Station, 90 m., *Hunter & Allen 653;* Río Viejo, vicinity Puerto Pilón, sea level, *Allen 4252.* DARIÉN: forests around Yaviza, *Pittier 6581;* vicinity Marragantí, 10–200 ft., *R. S. Williams 969.*

An attractive, large-flowered variety of *Aspasia epidendroides*, usually confined to areas of higher rainfall, being known from the vicinity of Puerto Limón, on the Atlantic coast of Costa Rica, and ranging eastward along the Atlantic seaboard, probably as far as Colombia. In the Canal Zone area, it follows the Río Chagres drainage to the headwaters of Madden Lake, crossing to the Pacific slope in the forested hills east of Panama City and continuing into Darién Province and the Perlas Islands, replacing the typical form from the Canal area eastward.

3. ASPASIA PUSILLA C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 10:21, *t. 1.* 1941.

Small, erect, epiphytic herbs with approximate, linear or ellipsoid-complanate, monophyllous pseudobulbs 2.5–4 cm. long and 1.0–1.5 cm. wide, the complanate-cylindric, stipitate bases invested by several distichously imbricating, conduplicate sheaths the upper 2–3 of which are conspicuously foliaceous and enveloping the lower portions of the pseudobulbs. Leaves linear-ligular, obliquely acute, subcoriaceous, up to 17 cm. long and 1.5 cm. wide, contracted below into short conduplicate petioles. Inflorescences slender, erect, few-flowered racemes up to about 8 cm. long. Flowers small for the genus, on long slender pedicels, the sepals and petals yellow to greenish yellow with a dark brown basal blotch, the lip white or pale yellow, the disk orange marked with mauve or maroon stripes. Sepals subequal, free, spreading, the dorsal sepal elliptic-lanceolate to oblanceolate, acute, about 13 mm. long and 4.5 mm. wide, the laterals lanceolate, acute, about 13.5 mm. long and 4 mm. wide. Petals subequal to the dorsal sepal, elliptic-oblanceolate, obliquely acute, about 12 mm. long and 4 mm. wide. Lip clawed at the base, the claw adnate to the lower half of the column, the free limb suborbicular to obovate, entire, about 11 mm. long and 12 mm. wide, the apex slightly retuse, broadly spreading, the base somewhat concave, the disk with a short pubescent, divaricate callus. Column very short, stout, about 5.5 mm. long, the apex with a denticulate

Fig. 195. *Aspasia pusilla*

hood over the anther, the lateral margins below the stigma with 2 short, porrect, obliquely triangular teeth.

Costa Rica and Panama.

DARIÉN: Cana-Cuasi trail, hills near Chepigana, 2000 ft., *Terry & Terry 1502*.

A very distinctive dwarf species, known in our area only from the type collection.

76. BRASSIA R. Brown

BRASSIA R. Br. in Ait. Hort. Kew. 2:215. 1813; Benth. & Hook. Gen. Pl. 3:564. 1883.

Erect, epiphytic herbs with short stems usually thickened into conspicuous pseudobulbs that are infrequently rudimentary and inconspicuous or rarely entirely absent, the 1–3 leaves at the apex enveloped in several foliaceous or papery bracts, the conduplicate leaf bases distichously imbricating and forming a broad or narrow fan. Inflorescences 1–2 erect or arching, few- to many-flowered racemes produced from the bases of the pseudobulbs or concurrently with the flush of new growth, or, if the plants are pseudobulbless, from the axils of the leaves. Flowers usually large and conspicuous, subtended by small and inconspicuous, or elongate spathaceous bracts. Sepals free, spreading, narrowly acuminate or caudate, sometimes of about equal length but more frequently with the lateral sepals conspicuously longer. Petals subequal to the dorsal sepal or smaller. Lip entire or obscurely 3-lobed, spreading, shorter than the sepals, the base sessile and adnate to the base of the column, the disk usually bilamellate. Column short, erect, without wings or appendages, the clinandrium scarcely prominent, usually truncate. Anther terminal, operculate, incumbent, 1-celled or imperfectly 2-celled; pollinia 2, waxy.

A small genus of American epiphytes, ranging from southern Florida and the West Indies to Mexico, Central America, and northern South America to Brazil, Bolivia, and Peru. They are technically inseparable from *Oncidium*, yet the majority of the species can readily be distinguished by the conspicuously elongate lateral sepals. **Five species are known from Panama.**

a. Plants without pseudobulbs, or apparently so.
  b. Leaves many, forming a broad fan, entirely without pseudobulbs. Lateral sepals 3.5 cm. long or more ..... 1. B. ALLENII
  bb. Leaves few, forming a narrow distichous petiole, usually enveloping a small rudimentary pseudobulb. Lateral sepals 2 cm. long or less .... 3. B. CHLOROPS
aa. Plants without conspicuous pseudobulbs. ..... 3. B. CHLOROPS
  b. Lateral sepals 2 cm. long or less .....
  bb. Lateral sepals 3 cm. long or more. ..... 5. B. LONGISSIMA
    c. Pseudobulbs monophyllous at the apex .....
    cc. Pseudobulbs diphyllous or rarely triphyllous at the apex.
      d. Apical half of the lip conspicuously broader than the basal half. Calli thickened into broad plates at the front. Highland species ..... 4. B. GIREOUDIANA
      dd. Apical half of the lip not conspicuously broader than the basal half. Calli at the front with 2 separate and distinct slender teeth. Lowland species ..... 2. B. CAUDATA

1. Brassia Allenii L. O. Wms. ex C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 13:145, *t. 12*. 1948.

Erect, epiphytic herbs entirely without pseudobulbs, the plants 30–38 cm. tall, nearly identical in vegetative appearance with *Huntleya meleagris*. Leaves 8–14, distichously arranged in the form of a broad fan, linear-ligular to lanceolate, usually shortly and subfalcately acuminate, subcoriaceous, 15–35 cm. long and 2–4 cm. wide, the conduplicate bases 2-ranked and closely imbricating, usually slightly broader at the suture line than the leaf petioles. Inflorescences erect or arching, 5- to 8-flowered, congested racemes ½ to ⅔ the length of the leaves. Flowers of moderate size, the lip usually uppermost in natural position, very fragrant, subtended by broad, acute or acuminate, papery, spathaceous bracts. Sepals subequal, free, spreading, reddish tan to olive-ocher, shading to cinnamon-buff at the base, linear-lanceolate, long-acuminate, 3.5–4 cm. long and 0.4–0.5 cm. wide. Petals subequal to the sepals and similarly colored, with a small triangular barium-yellow spot at the base, obliquely lanceolate, long-acuminate, the attenuate apices subfalcately incurving, 3–4 cm. long and 0.5–0.6 cm. wide. Lip entire, subquadrate to suborbicular, spreading, slightly convex, 15–20 mm. long and 13–16 mm. wide, barium-yellow, with a narrow, semicircular band of Mikado brown spots surrounding the disk, the base sessile and adnate to the base of the column, the apex abruptly contracted into an elongate, acuminate apicule, the disk white, with 2 short, stout, erect, parallel, strontian yellow keels, terminating at the front in 2 short, obtuse, subconic teeth. Column very short, stout, terete, about 5 mm. long, green or white, with 2 lateral Mikado brown blotches, without wings or appendages, the base without a foot.

Panama.

PANAMÁ: cloud forest on summit of Cerro Campana, 3000 ft., *Allen & Fairchild 5150*. COCLÉ: mountains beyond La Pintada, 400–600 m., *Hunter & Allen 592;* hills north of El Valle de Antón, 800–1000 m., *Fairchild s. n.*, *Ohlson s. n.*, *Allen 374, 2830, 2922, 3717*.

A very distinctive species entirely without pseudobulbs, apparently most nearly allied to *Brassia glumacea* Lindl. of Venezuela. The plants are nearly identical in superficial appearance with those of *Huntleya meleagris*, sometimes differing in the shortly and subfalcately acuminate apices of the leaves, and in the conduplicate leaf bases which are often rather noticeably dilated at the suture line and not uninterruptedly confluent with the leaf petioles, as in the latter. All specimens seen have originated in the cool wet forests north of El Valle de Antón, the cloud forest cap of Cerro Campana, or in the mountains west of Santa Fé, in Veraguas; the only presently accessible areas in Panama representative of the extensive and poorly known intermediate highlands of the Atlantic slope.

2. Brassia caudata (L.) Lindl. in Bot. Reg. 10: *t. 832*. 1824.

Epidendrum caudatum L. Sp. Pl. ed 2, 1349. 1763.
Malaxis caudata Willd. Sp. Pl. 4:93. 1805.
Oncidium caudatum Rchb. f. in Walp. Ann. 6:766. 1863.

Fig. 196. *Brassia Allenii*

Brassia Lewisii Rolfe, in Orch. Rev. 1:199. 1893.
Brassia longissima (Rchb. f.) Schltr. var. *minor* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:80. 1922.

Fig. 197. *Brassia caudata*

Erect, epiphytic herbs with approximate, linear to oblong-elliptic, ancipitous pseudobulbs 6–15 cm. long and 2–4 cm. wide, the truncate apices usually with 2 or rarely with 3 leaves, the bases of the pseudobulbs enveloped in 4–6 papery, closely imbricating bracts, the uppermost sometimes foliaceous. Leaves ligular to elliptic-oblong, obtuse to shortly acute, coriaceous, 16–27 cm. long and 2.5–6 cm. wide, contracted below into short conduplicate petioles. Inflorescences 1 or 2 arching, unbranched, usually 6- to 12-flowered racemes 15–30 cm. long, produced from the lateral bases of the pseudobulbs, the rachis often dull red, often rather complanate. Flowers large, with conspicuous caudate lateral sepals. Sepals free, spreading, greenish yellow to yellow, usually spotted reddish brown, particularly near the base, the dorsal sepal erect, linear-lanceolate, long-attenuate, 4–9 cm. long and 0.4–0.7 cm. wide, the apical half usually incurving, the lateral sepals conspicuously longer, caudate, of quite variable length, 12–30 cm. long and 0.5–0.6 cm. wide at the base, the outer surfaces with a strongly developed central keel. Petals free, greenish yellow or yellow, usually heavily spotted reddish brown near the base, the long attenuate apices falcately incurving, 2–3 cm. long and 0.3–0.4 cm. wide. Lip entire, oblong-lanceolate, long-acuminate, somewhat convex, often with deflexed lateral margins, yellow with reddish brown markings at the base, 3–5 cm. long and 1.0–1.2 cm. wide, the base sessile and adnate to the base of the column, the disk with 2 erect parallel lamellae in front of which are 2 short, distinct, acute teeth. Column stout, 4–5 mm. long, without wings or appendages, the base without a foot.

Mexico to Brazil and Bolivia; Florida; Greater Antilles.

CANAL ZONE: Miraflores, *Powell 3231*; Frijoles, *Powell 3117, 3256, Killip 3448*; Pedro Miguel, *Powell 3258, 3530, 3566*; Ancón, *Pittier 6631*; Barro Colorado Island, Gatún Lake, *Shattuck 202*. PANAMÁ: hills east of Panama City, *Powell 3275, Allen 4560*. DARIÉN: vicinity La Palma, 0–50 m., *Pittier 6619*. CHIRIQUÍ: exact locality lacking, sea level, *Powell 87*.

A very common and widely distributed species of the lowlands of the American tropics and subtropics. The flowers are somewhat variable in size, those with the longest sepals sometimes being confused with *Brassia longissima*, a very different species with monophyllous pseudobulbs, of the cool intermediate highland forests of the Atlantic slope. *Brassia longissima* var. *minor* is simply a small-flowered form of *B. caudata*.

3. BRASSIA CHLOROPS Endres & Rchb. f. in Gard. Chron. 542. 1873.

Brassia parviflora A. & S. in Sched. Orch. 8:74. 1925.

Erect, caespitose, epiphytic herbs usually with slender, complanate-elliptic, rudimentary, monophyllous pseudobulbs often completely enveloped by the conduplicate leaf bases. Leaves lanceolate, shortly acuminate, subcoriaceous, 8–30 cm. long and 1.4–3.0 cm. wide, the conduplicate bases distichously imbricating, often forming a short, narrow, complanate petiole, the leaves toward the base becoming progressively shorter, the lowest reduced to non-foliaceous bracts. In-

florescences erect, 3- to 7-flowered racemes 15–25 cm. long, produced from the axils of the upper leaves. Flowers very small for the genus. Sepals rather fleshy, free, subequal, spreading, linear-lanceolate, acuminate, 1.4–2 cm. long and 0.2–0.3 cm. wide. Petals subequal to the dorsal sepal, obliquely lanceolate, acuminate, 1.1–1.5 cm. long and 0.15–0.25 cm. wide. Lip entire, rather fleshy, elliptic-lanceolate to linear-lanceolate, acute, 1–1.1 cm. long and about 0.45 cm. wide, the apex usually dorsally carinate and recurved, the base adnate to the base of the column, the disk with 2 fleshy parallel pubescent keels, about ½ the total length of the lip, the apices terminating in 2 more or less prominent teeth. Column short, stout, about 5 mm. long, the base without a foot.

Costa Rica and Panama.

CHIRIQUÍ: vicinity Casita Alta, Finca Lérida, eastern slopes of Chiriquí Volcano, 1500–2000 m., *Woodson, Allen & Seibert 874.*

An aberrant highland species, having the aspect of a small-flowered *Odontoglossum*. It differs from most species of *Brassia* in the short sepals which are of about equal length, green with darker spots or brown with yellow markings. Our single specimen differs in color, and somewhat in structural detail from the type, but seems more readily referable to this species than to any other.

4. BRASSIA GIREOUDIANA Rchb. f. & Warscz. in Otto & Dietr. Allg. Gartenzeit. 22:273. 1854.

Oncidium Gireoudianum Rchb. f. in Walp. Ann. 6:768. 1863.

Erect, epiphytic herbs with approximate, fleshy, elliptic-ovoid, rather compressed, usually longitudinally ridged, diphyllous pseudobulbs 7–11 cm. long and 2.5–4 cm. wide, the bases enveloped in several papery, imbricating bracts the uppermost 1–2 of which are sometimes foliaceous. Leaves ligular to lanceolate, acute, coriaceous, 22–35 cm. long and 2–5 cm. wide, the bases contracted into short conduplicate petioles. Inflorescences usually solitary, elongate, arching, many-flowered racemes equaling or exceeding the leaves, usually produced concurrently with the flush of new growth from the axils of the expanding leaves or sometimes from the bases of the newly completed pseudobulbs. Flowers large and conspicuous, with elongate filiform sepals and petals. Sepals free, widely spreading, long-attenuate, greenish yellow with a few brown blotches near the base, the dorsal sepal narrowly linear-lanceolate, 9–10 cm. long and 0.3–0.4 cm. wide near the base, the lateral sepals somewhat longer, narrowly linear-lanceolate, 10–15 cm. long and 0.4–0.5 cm. wide near the base. Petals subequal to the dorsal sepal, spreading, the apical half greenish yellow, the basal half brown, narrowly linear-lanceolate, long-attenuate, 5–6 mm. long and 3–4 mm. wide near the base. Lip entire, rather rhombic in outline, 3–4.5 cm. long and 1.5–2.5 cm. wide, pale yellow with sparse brown spots and blotches, the basal portion subquadrate to oblong, adnate to the base of the column, the apical portion abruptly dilated and cordate, shortly acuminate or apiculate, the disk with 2 fleshy, minutely puberulent

keels, the basal portions erect and parallel, terminating at the apex in 2 larger subquadrate spreading lobules. Column very short, stout, 3.5–5 mm. long, the base without a foot.

Costa Rica and Panama.

CHIRIQUÍ: "On banks of rivers", 3500–4500 ft., *Powell 143;* Llano del Volcán, and along Río Chiriquí Viejo, 1200 m., *Allen 915.*

5. BRASSIA LONGISSIMA (Rchb. f.) Nash in Bailey, Stand. Cyclop. Hort. 1:541. March, 1914.

Brassia Lawrenciana Lindl. var. *longissima* Rchb. f. in Gard. Chron. 1313. 1868.
Brassia longissima (Rchb. f.) Schltr. Die Orchideen, 496. October 1914, as to basinym, but only in part as to plant described.

Erect, epiphytic herbs with approximate, very strongly flattened, oblong to elliptic-oblong, monophyllous pseudobulbs, with very thin, acute margins, 4–16 cm. long and 3–5 cm. wide, the bases enveloped in several conduplicate, imbricating, papery bracts, the uppermost one of which is usually shortly foliaceous. Leaves oblong-lanceolate, acute, coriaceous, 25–55 cm. long and 4–7 cm. wide, the bases contracted into very short, conduplicate petioles. Inflorescences 1 or rarely 2, arching, few-to many-flowered racemes 25–45 cm. long, produced from the bases of the pseudobulbs. Flowers large and conspicuous, with elongate, filiform, lateral sepals. Sepals yellow to greenish yellow, spotted or blotched reddish brown near the base, the dorsal sepal narrowly linear-lanceolate, long-attenuate, 8–10 mm. long and 3–4 mm. wide at the base, the lateral sepals conspicuously longer, narrowly linear-lanceolate, caudate, 10–18 cm. long and 0.3–0.4 cm. wide. Petals shorter than the dorsal sepal, yellow to greenish yellow, reddish brown near the base, narrowly linear-lanceolate, the attenuate apices subfalcately incurving, 4–5 cm. long and 0.3–0.4 cm. wide at the base. Lip entire, pale yellow to greenish white, with sparse reddish brown spots near the base, lanceolate, acuminate, 3–5 cm. long and 1.0–1.5 cm. wide, the base somewhat concave with erect margins, adnate to the base of the column, the disk with an erect, fleshy, minutely puberulent, bilamellate, obliquely truncate callus. Column short, semiterete, about 8 mm. long, the base without a foot.

Costa Rica, Panama, Peru, and probably adjacent territories.

COCLÉ: region north of El Valle de Antón, 1000 m., *Fairchild s. n.*; Loma del Tigre, hills north of El Valle, 3000 ft., *Allen 4562.*

This very distinctive species has thus far been found only twice in Panama, both times in the wet highland forests north of El Valle de Antón, in Coclé Province, at about 3000 ft. elevation, although the species is to be expected generally in similar areas on the Atlantic slope.

Since there seems to be some confusion in regard to the application of the name *Brassia longissima,* it might be well to give something of its history. Both

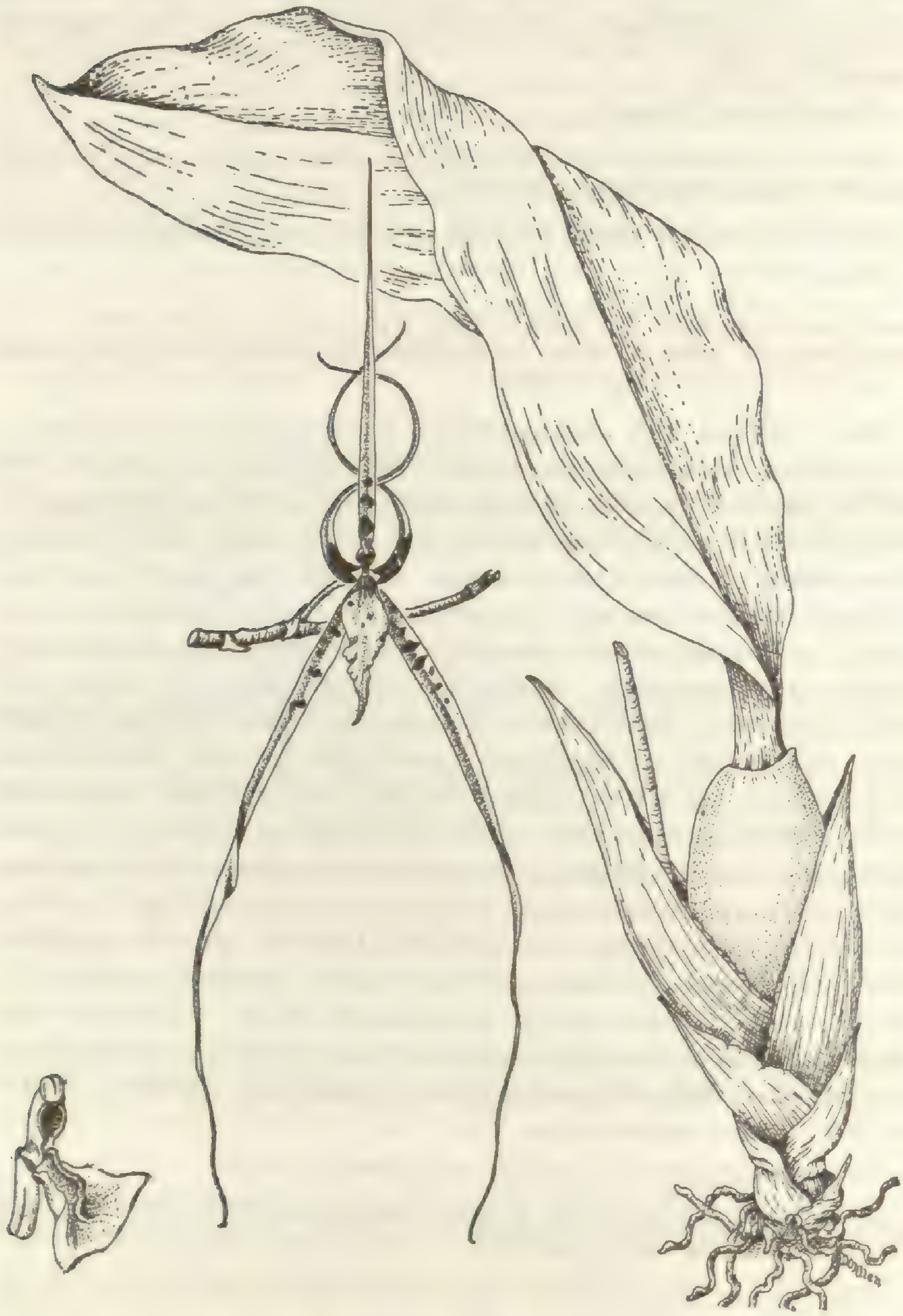


Fig. 198. *Brassia longissima*

Nash (in Bailey Stand. Cyclop. Hort. 1:541. March, 1914) and Schlechter (Die Orchideen, 496. October, 1914) decided that the entity hitherto known as *Brassia Lawrenciana* Lindl. var. *longissima* Rchb. f. actually represented a distinct species, citing Reichenbach's variety as the name-bringing synonym. The

accompanying description given by Nash, whose publication antedated that of Schlechter by some six months, essentially followed Reichenbach's original, while that of Schlechter was apparently based on two distinct elements: the Reichenbach variety of *B. Lawrenciana*, and a very different plant that we now know was a large-flowered form of *B. caudata* (*Powell 87*). Although under the rules, the name of *B. longissima* (Rchb. f.) Schltr. must be regarded as synonymous with the name-bringing synonym, or the first published derivative name therefrom, there can be no doubt that the plant which Schlechter had in mind was a large-flowered form of *B. caudata.* This is further borne out by his subsequent description of another, smaller-flowered form of *B. caudata* under the name of *B. longissima* var. *minor* (in Fedde Rep. Sp. Nov. Beih. 17:80. 1922).

77. MILTONIA Lindl.

MILTONIA Lindl. in Bot. Reg. 23: sub *t. 1976.* 1837; Benth. & Hook. Gen. Pl. 3:563. 1883.

? *Gynizodon* Raf. Fl. Tellur. 4:40. 1836.
Macrochilus Knowles & Westcott, Fl. Cab. 1:93, *t. 45.* 1837.

Epiphytic herbs, with short, usually rather inconspicuous, compressed pseudobulbs bearing 1–2 leaves at the apex, the base enveloped in few to many distichous, imbricating, conspicuously foliaceous bracts. Leaves and bract blades elliptic-lanceolate to narrowly linear, coriaceous to subcoriaceous, contracted at the base into short or elongate conduplicate petioles. Inflorescences axillary from the base of the pseudobulb, often short, erect or arching, 1- to few-flowered scapes or sometimes elongate, many-flowered racemes. Flowers relatively large and conspicuous, on long slender pedicels subtended by elongate, spathaceous, or sometimes minute and inconspicuous bracts, the perianth segments and the lip usually being all on one plane so that the flowers are typically flat. Sepals subequal, spreading, free, or the laterals very shortly connate at the base. Petals subequal to the sepals or a little broader. Lip entire, broadly spreading, the apex often bifid, the base sessile or very shortly and broadly clawed and affixed to the base of the column usually at a right angle, the disk inconspicuously or sometimes prominently lamellate. Column short, the apex or anterior portion variously 2-auriculate or 2-alate, the clinandrium short, truncate, or the apex 2-lobed, or sometimes membranaceous and dilated, 2- to 3-lobed, the base without a foot. Anther terminal, operculate, incumbent, 1- or imperfectly 2-celled; pollinia 2, waxy.

About 20 species of attractive, mostly highland epiphytes closely allied to *Oncidium* and *Odontoglossum*, having centers of development in the mountains of Colombia and southern Brazil, with a single species known from as far north as Costa Rica.

1. MILTONIA ENDRESII Nichols. in Dict. Gard. 2:368. 1888.

Odontoglossum Warscewiczii Rchb. f. in Bot. Zeit. 10:692. 1852.
Miltonia superba Schltr. in Fedde Rep. Sp. Nov. 3:249. 1907.

Erect, caespitose, epiphytic herbs with distichous, foliaceous stems 16–38 cm. tall, the conduplicate, imbricating leaf bases enveloping a small complanate, elliptic-oblong, monophyllous pseudobulb 3–5 cm. tall and 1.2–1.5 cm. wide. Leaves narrowly linear to lanceolate, obliquely acute to acuminate, coriaceous, the blades 12–30 cm. long and 1–2.5 cm. wide, contracted below into short or elongate conduplicate petioles. Inflorescences 1 or 2 erect or arching, 2- to 5-flowered racemes 15–30 cm. long, produced from the lateral bases of the pseudobulbs. Flowers large and conspicuous, on elongate pedicels, white with a rose-purple blotch at the base of the perianth segments and two blotches at the base of the lip, or sometimes entirely white with a golden yellow disk. Sepals broadly ovate, the laterals acute, the dorsal sepal usually obtuse with a minute apicule, 2.5–3 cm. long and 1–1.5 cm. wide. Petals a little broader than the sepals, spreading, elliptic-obovate, obtuse or minutely apiculate, about 2.5 cm. long and 1.2–1.6 cm. wide. Lip entire, broadly panduriform, 3–3.5 cm. long and 2.5–4 cm. wide, the apex broadly emarginate and 2-lobed, sometimes with a minute central mucro, the base of the lip with a very short, broad claw which is affixed at right angles to the base of the column, the disk with 3 short, fleshy, obtuse, puberulent keels. Column stout, 4–5 mm. long, the apex dilated, nearly wingless.

Costa Rica and Panama.

CHIRIQUÍ: trail from Paso Ancho to Monte Lirio, upper valley of the Río Chiriquí Viejo, 1500–2000 m., *Allen 1508*.

An attractive highland species, often forming clumps in the tops of the tallest forest trees. Our specimens have pure white flowers, with a yellow disk, and narrower leaves than in the Costa Rican material, but otherwise seem to be identical. Mr. Walter Cope, of Pedro Miguel, reports that *Miltonia Roezlii* Nichols., a lowland species of the Colombian Choco, has been found in the upper Madden Lake region.

78. ONCIDIUM Swartz

ONCIDIUM Sw. in Vet. Akad. Nya Handl. Stockh. 21:239. 1800; Lindl. Folia Orch. Oncidium, (1). 1855; Benth. & Hook. Gen. Pl. 3:562. 1883.

? Phadrosanthus Neck. Elem. 3:153. 1790.
Cyrtochilum HBK. Nov. Gen. & Sp. 1:349. 1815.
Cyrtochilos Spreng. Syst. Veg. 3:729. 1826.
Coppensia Dum. in Mem. Acad. Brux. 9:10. 1835, in nota.
Tolumnia Raf. Fl. Tellur. 2:101. 1836.
Xeilyathum Raf. loc. cit. 62. 1836.
Xaritonia Raf. loc. cit. 4:9. 1836.
Psychopsis Raf. loc. cit. 40. 1836.
Lophiaris Raf. loc. cit. 40. 1836.
Olgasis Raf. loc. cit. 51. 1836.
Palumbina Rchb. f. in Walp. Ann. 6:699. 1861.
Papiliopsis E. Morr. in Belg. Hortic. 24:261. 1874.
Baptistonia Barb. Rodr. Gen. & Sp. Orch. Nov. 1:95. 1877.

Erect or pendulous, epiphytic or infrequently terrestrial herbs with short, foliaceous stems, most frequently thickened into conspicuous, more or less ancipitous, 1- to 2 (rarely more)-leaved pseudobulbs, the bases enveloped in several papery or foliaceous bracts, or less frequently with the pseudobulbs very short, rudimentary, cylindric, subconic, or complanate-cylindric, enveloped in several papery sheaths, or the plants rarely with many distichously equitant leaves and entirely without pseudobulbs. Leaves subcoriaceous, coriaceous or fleshy, equitant, flat, terete or triangular. Inflorescences usually 1 or 2 short or elongate, often flexuose, erect, arching or laxly pendulous, branching panicles, simple racemes, or 1-flowered scapes produced from the lateral bases of the pseudobulbs, or in the equitant-leaved species from the axils of the leaves. Flowers often large and conspicuous, usually yellow or brown. Sepals usually subequal, spreading or reflexed, free, or the laterals somewhat connate rarely nearly to the apex, the dorsal sepal rarely much longer and narrower than the laterals. Petals subequal to the dorsal sepal or sometimes larger. Lip usually 3-lobed, often pandurate, rarely nearly entire, the base shortly clawed or sessile and adnate to the base of the column, usually forming a right-angle with it, the lateral lobes porrect, spreading or reflexed, sometimes obsolete, the central portion of the lip usually with an isthmus, the mid-lobe spreading, usually very broad and transversely dilated, rarely narrow, often emarginate or bifid, the disk usually conspicuously cristate or tuberculate. Column usually short, stout, the lateral margins near the stigma with or without auriculate or petaloid projections, the clinandrium very short and truncate or ovate and obliquely erect, entire or with the apex shortly bidentate, the base footless or sometimes apparently with a short foot, rarely produced into a prominent, erect, horn-like process. Anther terminal, operculate, incumbent, strongly convex, semiglobose or cucullate, 1-celled, imperfectly or rarely 2-celled; pollinia 2, usually deeply sulcate, waxy.

A very large, polymorphic genus of often attractive, usually epiphytic American orchids ranging from Florida and Mexico to the West Indies and South America as far as Peru, Bolivia, and Brazil. Twenty-six species are thus far known from Panama.

a. Plants without pseudobulbs, or the pseudobulbs rudimentary and inconspicuous.
  b. Leaves solitary, fleshy, from the apex of a very short subconic or subcylindric stem. Basal sheathing bracts papery.
    c. Leaves broadly lanceolate to elliptic-oblong ..... 6. O. CARTHAGINENSE
  cc. Leaves terete.
    d. Lip more than twice as long as the lateral sepals. Basal callus occupying less than half of the total length of the isthmus.
      e. Flowers very small, the lip 1 cm. long or less, at the base with 2 separate and distinct keels ending in small tubercles on either side of the central boss ..... 9. O. EBRACHIATUM
      ee. Flowers of moderate size, the lip 1 cm. long or more, at the base without keels or tubercles on either side of the prominent central boss ..... 24. O. STIPITATUM
    dd. Lip less than twice as long as the lateral sepals. Basal callus very prominent, occupying nearly all of the central isthmus ..... 25. O. TERES
  bb. Leaves many, coriaceous or subcoriaceous, the conduplicate bases

distichously imbricating.
c. Plants dwarf, less than 10 cm. tall.
d. Leaves not equitant, the conduplicate bases enveloping a small pseudobulb. Peduncles filiform, not conspicuously flattened at the apex ..... 8. O. CRISTA-GALLI
dd. Leaves equitant, the plants entirely without pseudobulbs. Peduncles conspicuously flattened, particularly near the apex ..... 22. O. PUSILLUM
cc. Plants robust, more than 35 cm. tall.
d. Base of the lip with prominent, well-developed lateral lobes ..... 17. O. OCHMATOCHILUM
dd. Base of the lip without prominent, well-developed lateral lobes .. 19. O. PANDURIFORME
aa. Plants with conspicuous pseudobulbs.
b. Lip conspicuously exceeding the lateral sepals in length.
c. Pseudobulbs suborbicular, about as broad as long.
d. Pseudobulbs very distantly inserted on an elongate, slender, flexuose rhizome ..... 11. O. GLOBULIFERUM
dd. Pseudobulbs approximate on a short rhizome.
e. Bracts enveloping the base of the pseudobulb foliaceous.
f. Apex of the pseudobulb diphyllous ..... 15. O. NEBULOSUM
ff. Apex of the pseudobulb monophyllous.
g. Apical leaf of the pseudobulb much reduced, conspicuously less than the bract blades in length ..... 8. O. CRISTA-GALLI
gg. Apical leaf of the pseudobulb about equal to the bract blades in length.
h. Lip with a distinct rectangular isthmus ..... 16. O. OBRYZATUM
hh. Lip with a sharp median constriction, but without a distinct rectangular isthmus ..... 7. O. CHEIROPHORUM
ee. Bracts enveloping the base of the pseudobulb not foliaceous .... 1. O. AMPLIATUM
cc. Pseudobulbs elliptic-oblong to oblong-ovoid, usually more than twice as long as broad.
d. Pseudobulbs monophyllous at the apex. Sepals about 5 mm. long ..... 20. O. PARVIFLORUM
dd. Pseudobulbs 2- to 3-leaved at the apex.
e. Inflorescences with both normal and abortive sterile flowers .... 12. O. HETERANTHUM
ee. Inflorescences with only normal fertile flowers.
f. Sepals obovate-spatulate, broadly obtuse or truncate ..... 16. O. OBRYZATUM
ff. Sepals lanceolate to elliptic-lanceolate, acute to subacute.
g. Isthmus broad, at least half the width of the mid-lobe .... 5. O. CABAGRAE
gg. Isthmus narrow, usually less than ¼ the width of the mid-lobe ..... 13. O. ISTHMI
bb. Lip subequal to the lateral sepals or shorter.
c. Lateral sepals connate nearly to the apex ..... 26. O. WARSCEWICZII
cc. Lateral sepals free, or only very shortly connate at the base.
d. Dorsal sepal and petals elongate, linear-spatulate, very dissimilar to the broad lateral sepals. Flowers solitary, at the apex of an elongate scape ..... 14. O. KRAMERIANUM
dd. Sepals and petals more or less similar in shape.
e. Floral bracts very large and conspicuous.
f. Flowers more than 3 cm. in diameter, the mid-lobe of the lip subequal to the dorsal sepal in width ..... 21. O. POWELLII
ff. Flowers less than 3 cm. in diameter, the mid-lobe of the lip conspicuously exceeding the dorsal sepal in width ..... 4. O. BRACTEATUM
ee. Floral bracts small or slender and inconspicuous.
f. Leaves narrowly linear-ligular, acute or acuminate. Pseudobulbs usually 2- to 3-leaved at the apex.
g. Lower portions of the foliaceous bracts not articulated, without a suture ..... 10. O. ENSATUM
gg. Lower portions of the foliaceous bracts articulated, with a distinct suture.
h. Lip with a distinct isthmus, the callus with 2 crenulate or denticulate, lateral plates at the base ..... 3. O. BAUERI
hh. Lip without a distinct isthmus, the callus surmounted by 4 divergent, crenulate keels ..... 18. O. PANAMENSE
ff. Leaves broadly lanceolate, obtuse to subacute. Pseudobulbs usually monophyllous at the apex.

g. Lip distinctly shorter than the lateral sepals.
  h. Mid-lobe of the lip about equaling the dorsal sepal in width. Apex of the callus with a broad transverse plate..... 21. O. POWELLII
  hh. Mid-lobe of the lip conspicuously exceeding the dorsal sepal in width. Apex of the callus with 3 fleshy teeth.. 23. O. STENOTIS
gg. Lip about equaling the lateral sepals, or somewhat longer.
  h. Pseudobulbs exceptionally thin and flattened, without prominent longitudinal ridges, the conduplicate bases of the foliaceous bracts thin and papery..... 2. O. ANSIFERUM
  hh. Pseudobulbs not exceptionally thin and flattened, with prominent longitudinal ridges, the conduplicate bases of the foliaceous bracts coarsely fibrous..... 3. O. BAUERI

1. ONCIDIUM AMPLIATUM Lindl. Gen. & Sp. Orch. Pl. 202. 1833.

Oncidium Bernoullianum Kränzl. in Engler, Pflazenr. IV, Fam. 50 (Heft 80):231. 1922.

Epiphytic herbs with ovoid to suborbicular, strongly compressed, or sometimes angular, pseudobulbs which are often longitudinally ridged and transversely wrinkled, 3–12 cm. tall and 3–9 cm. wide, usually flecked with red or brown, rarely entirely raisin-purple, the apex with 1–3 leaves, the base enveloped in several papery, imbricating bracts. Leaves elliptic-oblanceolate to ligular, obtuse to subacute, coriaceous, 8–40 cm. long and 3–12 cm. wide, contracted below into short conduplicate petioles. Inflorescences 1 or 2 erect or arching, few- to many-flowered racemes or panicles conspicuously exceeding the leaves in length, produced laterally from the bases of the pseudobulbs. Flowers variable in size but averaging about 2.5 cm. in diameter, bright yellow, nearly white on the reverse surfaces, the sepals spotted with reddish brown, the callus white spotted red. Sepals free, subequal, spreading, oblong-spatulate, obtuse, the dilated apices deeply concave, 6–10 mm. long and 3.5–5 mm. wide. Petals much broader than the sepals, clawed at the base, with flat suborbicular blades, 7–11 mm. long and 5–9 mm. wide. Lip very broadly spreading, 3-lobed, 1.5–2 cm. long and 2–3 cm. wide, the lateral lobes relatively small, subauriculate, obtuse, the central portion of the lip with a short constriction, the mid-lobe abruptly dilated, deeply emarginate and 2-lobed, transversely oblong or reniform, the base of the lip contracted into a short claw and adnate to the base of the column, the disk with an erect, fleshy callus, surmounted by a transverse biauriculate plate and terminating at the apex in a prominent tridenticulate process. Column very short, 3–4 mm. long, the apex with 3 denticulate wings, the base without a foot.

Guatemala to Peru, Venezuela, and Trinidad.

CANAL ZONE: Chagres, sea level, *Fendler 331*; near Culebra, 50–100 m., *Pittier 3397*; Cruces, sea level, *Powell 3199*; Barro Colorado Island, Gatún Lake, *Woodworth & Vestal 706*, *Shattuck 203*; Frijoles, *Powell 3211*; McComber Hill, 300 ft., *Powell 3200*. PANAMÁ: near Bejuco, 100 ft., *G. Fairchild s. n.* COCLÉ: near La Pintada, 150 m., *Allen 3918*. VERAGUAS: Bahia Honda, *Taylor 1512*.

An attractive lowland species with bright yellow flowers, widely distributed in the American tropics. In Panama they were formerly very frequent in the Chagres River valley, and in general along streams where they were often found high on the trunks and branches of the common *Espavé* (*Anacardium excelsum*). The

Fig. 199. *Oncidium ampliatum*

larger-flowered forms are often offered for sale under the name of *Oncidium ampliatum* var. *majus*.

2. ONCIDIUM ANSIFERUM Rchb. f. in Bot. Zeit. 10:696. 1852.

Oncidium ensatum Hort. ex Rchb. f. in Xenia Orch. 1:232. 1858, in synon., non Lindl.
Oncidium hieroglyphicum Hort. pro parte ex Rchb. f. loc. cit. 1858, in synon.
Oncidium Lankesteri Ames, in Sched. Orch. 4:53. 1923.
Oncidium naranjense Schltr. in Fedde Rep. Sp. Nov. Beih. 19:259. 1923.

Epiphytic herbs with very strongly compressed, exceptionally thin, ovate-elliptic or oblong-elliptic, usually smooth pseudobulbs 6–10 cm. tall and 3–6 cm. wide, the apices with 1 or infrequently 2 leaves, the bases with several distichously imbricating bracts the uppermost 2–3 of which are conspicuously foliaceous. Leaves lanceolate to elliptic-lanceolate, subacute to obtuse, pergameneous, 15–33 cm. long and 2.5–5.5 cm. wide. Inflorescences 1 or 2 erect or arching panicles, usually much exceeding the leaves, up to about 1 m. in length, produced from the lateral bases of the pseudobulbs. Flowers of moderate size, averaging about 3 cm. in diameter, the sepals and petals brown, sometimes with yellow margins and apices, the mid-lobe and lateral lobes of the lip bright yellow, the central isthmus brown with a bright yellow crest. Sepals subequal, free, spreading, elliptic-lanceolate, obtuse to acute, with strongly undulate margins, 1.2–1.7 cm. long and 0.4–0.6 cm. wide. Petals somewhat broader than the sepals, spreading, elliptic-oblong, obtuse to subacute, with undulate margins, 1.4–1.6 cm. long and 0.5–0.65 cm. wide. Lip pandurate, 3-lobed, 1.4–1.6 cm. long and 1–1.5 cm. broad at the transversely reniform, emarginate apex, the mid-section of the lip abruptly contracted in front into a broad isthmus, the basal portions more or less confluent with the short, suborbicular, lateral lobes, the disk with a 5-lobed puberulous crest, terminating in a central porrect tooth. Column short, 4–6 mm. long, the apex with dolabriform wings.

Costa Rica and Panama.

CHIRIQUÍ: Río Chiriquí Viejo, vicinity Paso Ancho, 5000 ft., *H. Dunn s. n.*; Llano del Volcán, western slopes of Chiriquí Volcano and along Río Chiriquí Viejo, 1200 m., *Allen 1011*.

An attractive highland species, readily distinguished from other Panama Oncidiums by the broad, smooth, exceptionally thin pseudobulbs.

3. ONCIDIUM BAUERI Lindl. in Bauer & Lindl. Ill. Orch. Gen. *t. 7*. 1830-38.

Oncidium altissimum var. β Lindl. Gen. & Spec. Orch. Pl. 200. 1833.
Epidendrum gigas L. C. Rich. ex Lindl. loc. cit. 200. 1833.
Oncidium altissimum Lindl. in Bot. Reg. 19: *t. 1651*. 1833, non Sw.
Oncidium polycladium Rchb. f. ex Lindl. Fol. Orch. Oncidium, (47). 1855.
Oncidium altissimum var. *Baueri* Stein, Orchideenb. 404. 1892.

Erect, robust, epiphytic herbs with approximate, oblong-ovoid, strongly ridged pseudobulbs up to about 18 cm. tall and 4 cm. wide, the apices with 1 or 2 leaves, the lower portions enveloped in the coarsely fibrous, conduplicate, imbricating

bases of several conspicuously foliaceous bracts. Leaves and bract blades linear-ligular, acute, subcoriaceous, up to about 75 cm. long and 2.5–4 cm. wide. Inflorescences 1 or 2 stout, erect, arching or pendulous, many-flowered panicles up to about 3 m. in length, produced from the lateral bases of the pseudobulbs. Flowers of moderate size, 2.5–3 cm. in diameter. Sepals free, subequal, spreading or reflexed, shortly clawed at the base, yellow marked with brown, the dorsal sepal elliptic-lanceolate, acute, 1–1.5 cm. long and 0.4–0.5 cm. wide, the lateral sepals obliquely linear-lanceolate, acute or shortly acuminate, the dorsal surface with a distinct central keel, 1.2–1.7 cm. long and 0.35–0.45 cm. wide. Petals subequal to the dorsal sepal and similarly colored, elliptic-lanceolate, acute, with undulate margins, 1–1.4 cm. long and about 0.5 cm. wide. Lip pandurate, 3-lobed, yellow with a reddish brown central blotch, 1.2–1.5 cm. long and 0.9–1.2 cm. wide, the lateral lobes small, suborbicular to subquadrate, obtuse, the central portion of the lip contracted into a distinct isthmus, the mid-lobe abruptly dilated, emarginate and bilobed, transversely reniform in outline, the disk with an erect, fleshy callus, at the base with 2 lateral crenulate or denticulate wings or plates, the apex with 3 short, fleshy teeth. Column about 5 mm. long, with the lateral wings often bifid, the lower lobules obtuse and spreading, the apices acute or acuminate, often more or less converging.

Mexico to Brazil and Peru; Virgin Islands and Martinique.

PANAMÁ: without definite locality, Pacific coast lowlands, *Fairchild s. n.* CHIRIQUÍ: without definite locality, *von Warscewicz s. n.* (fide Reichenbach).

The species of this type form a closely allied, very perplexing association including *Oncidium altissimum* Sw., *O. Baueri* Lindl., *O. sphacelatum* Lindl., *O. polycladium* Rchb. f., *O. stenotis* Rchb. f., *O. isthmi* Schltr., and *O. panamense* Schltr. *Oncidium stenotis* and *O. isthmi* can be separated easily, and although *O. sphacelatum* and *O. panamense* are very nearly alike, they differ from the other species in the broad basal half of the lip, without a distinct isthmus. The most troublesome series involves the remaining species, which have a broad but distinct isthmus to the lip, a transversely reniform mid-lobe, and variously developed multi-denticulate basal calli. These are extremely difficult to distinguish from one another, at least on the basis of herbarium material, since most of the described differences consist more nearly in the degree of development of essentially identical parts, rather than in any basic structural deviation. In particular, there seem to be no consistent characters upon which to base the further segregation of *O. polycladium* from *O. Baueri*, the former concept being here reduced to synonymy, thus extending the range of the widespread South American and West Indian *O. Baueri* as far north as Mexico. In our material, the latter species is separable from *O. panamense* by the distinct isthmus of the lip; from *O. isthmi* by the broader isthmus and narrower, shorter mid-lobe; and from *O. stenotis* by the smaller flowers, in which the lip is about equal to the lateral sepals in length. It seems quite probable that further study may reduce some of these, and other closely allied concepts, to varietal status or synonymy.

4. ONCIDIUM BRACTEATUM Warsc. & Rchb. f. in Bot. Zeit. 10:695. 1852.

Erect, epiphytic herbs with slender brown, compressed pseudobulbs, more or less linear in outline but usually somewhat broader at the base and tapering gradually to a narrower apex, 6–12 cm. tall and 1.5–3 cm. wide at the base, terminating above in 1 or 2 leaves, the base enveloped in several distichously imbricating bracts, the uppermost 2 or 3 of which are conspicuously foliaceous. Leaves ligular, obtuse, coriaceous, 15–45 cm. long and 2–3.2 cm. wide, contracted below into elongate, slender, conduplicate petioles. Inflorescences 1 or 2 erect or arching panicles much exceeding the leaves, up to about 1 m. in length, the lateral branches short, usually 3-flowered, provided with several conspicuous, elongate, acute, pale brown, spathaceous bracts. Flowers of moderate size, the sepals and petals greenish yellow or yellow, heavily blotched and spotted dark brown or maroon, the apical and lateral lobes of the lip bright yellow, the central isthmus brown or maroon. Sepals subequal, free, spreading, with undulate margins, the dorsal sepal oblong-lanceolate, acute, 10–15 mm. long and 3.5–5 mm. wide, the lateral sepals linear-lanceolate, obliquely acute, with a distinct central keel on the dorsal surface, 12–17 mm. long and 2.5–4.5 mm. wide. Petals subequal to the dorsal sepal, elliptic-lanceolate, acute, with undulate margins, 10–15 mm. long and 4–6 mm. wide. Lip panduriform, with a broad central isthmus, 12–15 mm. long and 10–12 mm. wide at the 2-lobed emarginate apex, the base with 2 small, suborbicular, lateral auricles, the disk with an erect, more or less triangular, multidenticulate callus. Column 5–6 mm. long, with narrow lateral wings, the base without a foot.

Costa Rica and Panama.

Although absent from recent collections in our area, the species was originally described from plants presumably found in Panama by von Warscewicz, the data being given as "Chiriquí Cordilleren 6–9000 ft. auf Bäumen." They are readily distinguished by the narrow brown pseudobulbs and the very conspicuous, pale brown, spathaceous floral bracts.

5. ONCIDIUM CABAGRAE Schltr. in Fedde Rep. Sp. Nov. 9:292. 1911.

Oncidium Rechingerianum Kränzl. in Engler, Pflanzenr. IV, Fam. 50 (Heft 80):202, *fig. 18, C:a-c.* 1922.

Erect, epiphytic herbs with slender, elliptic-ovoid to nearly linear, ancipitous pseudobulbs usually 6–11 cm. tall and 2–3 cm. wide, densely spotted dark brown or black, often becoming longitudinally ridged with age, the apex with 2 or 3 leaves, the lower portions enveloped in the conduplicate bases of several distichously imbricating bracts, the uppermost 2 or 3 of which are conspicuously foliaceous. Leaves ligular, acute, subcoriaceous, 15–25 cm. long and 1.5–3 cm. wide, contracted below into slender, conduplicate petioles. Inflorescences usually solitary, erect or arching, many-flowered panicles much exceeding the leaves, up to about 80 cm. in length, produced from the lateral bases of the pseudobulbs. Flowers of moderate size, the sepals and petals heavily blotched rich chestnut-brown, usually

with yellow margins and apices, the mid-lobe and lateral lobules of the lip bright yellow with the central isthmus a rich reddish brown, the callus white spotted with brown. Sepals subequal, free, usually reflexed, with recurved apices, the dorsal sepal elliptic-obovate, acute, usually 8–12 mm. long and 4–6 mm. wide, the laterals linear-lanceolate to rather obliquely ligular, subacute to acute, with a distinct dorsal keel, usually 8–12 mm. long and 3–4 mm. wide. Petals somewhat broader than the sepals, slightly reflexed, with rather undulate margins, elliptic-oblanceolate, obtuse or acute, usually 10–12 mm. long and 5–6 mm. wide. Lip pandurate, usually 12–16 mm. long and 10–14 mm. wide at the 2-lobed, emarginate apex, the central portion abruptly contracted into a broad isthmus, the base with 2 small, lateral, obtuse, subquadrate auricles, the disk with an erect, fleshy, truncate keel, the upper margins with 2 pairs of fleshy teeth, the basal pair larger than the apical pair. Column short, erect, about 5 mm. long, with broad, lateral, spreading, rather bilobed or minutely dentate wings, the base of the column without a foot.

Costa Rica and Panama.

COCLÉ: region north of El Valle de Antón, 1000 m., *Allen 2361, 3681, 3776;* mountains beyond La Pintada, 400–600 m., *Hunter & Allen 589.* CHIRIQUÍ: without definite locality, 4000–5000 ft., *Powell 161, 177;* vicinity Palo Alto, 4000 ft., *Powell 301;* Llano del Volcán, 1000 m., ***Kieswetter s. n.***

An attractive species of the Coclé and Chiriquí highlands, usually found growing in the tops of tall trees.

6. ONCIDIUM CARTHAGINENSE (Jacq.) Sw. in K. Vet. Akad. Stockh. Nya Handl. 21:240. 1800.

Epidendrum carthaginense Jacq. Select. Stirp. Amer. 228, *t. 133, fig. 4.* 1763.
Epidendrum undulatum **Sims, in Bot. Mag.** ***t. 777.*** **1804.**
Oncidium undulatum Salisb. in Trans. Roy. Hort. Soc. 1:295. 1812, non Lindl.
Oncidium panduriferum Kunth, in HBK. Nov. Gen. & Spec. 1:346, *t. 82.* 1815.
Oncidium Oerstedii Rchb. f. in Bonplandia 2:91. 1854.
Oncidium carthaginense (Jacq.) Sw. var. *Oerstedii* (Rchb. f.) Lindl. Fol. Orch. Oncid. (40). 1855.
Oncidium carthaginense (Jacq.) Sw. var. *Swartzii* Lindl. loc. cit. 1855.
Oncidium obsoletum Rich. et Gal. ex Lindl. loc. cit. 41. 1855.
Oncidium kymatoides Kränzl. in Engler, Pflanzenr. IV, Fam. 50 (Heft 80):112. 1922.
Oncidium Oerstedii Rchb. f. var. *crispiflorum* Schltr. in Fedde, Rep. Sp. Nov. Beih. 17:85. 1922.

Robust, epiphytic herbs with very short, subquadrate, compressed or subcylindric, nearly obsolete pseudobulbs 1–2 cm. long and 1–1.5 cm. broad, the truncate apex with a single persistent, broadly lanceolate to elliptic-oblong, acute, usually fleshy leaf, which usually is more or less spotted reddish brown, 15–60 cm. long and 3.5–8 cm. wide, the lower surface with a strongly developed central keel, the pseudobulbs and the bases of the new leaves enveloped in 3–4 papery, closely imbricating bracts. Inflorescences elongate, erect, usually solitary, arching or sometimes pendulous, many flowered panicles up to 1.5 m. in length, produced from the bases of the pseudobulbs. Flowers variable in size and color, averaging

Fig. 200. *Oncidium carthaginense*

about 2 cm. in diameter, usually more or less heavily blotched and spotted with purplish rose on a white base. Sepals of about equal length, spreading, or with the laterals somewhat reflexed, distinctly clawed at the base, the blades with strongly undulate margins, the dorsal sepal free, the claw narrowly linear, the blade abruptly dilated and suborbicular, somewhat concave, 8–11 mm. long and 5–7 mm. wide, the lateral sepals very shortly connate at the base, the blades obovate-spatulate, obtuse to acute, 7–12 mm. long and 4–6 mm. wide. Petals distinctly clawed at the base, spreading, with undulate, often crisped margins, the blades oblong to elliptic-oblong, obtuse, 8–12 mm. long and 5–7 mm. wide. Lip pandurate in outline, 3-lobed, abruptly contracted at the base and adnate to the base of the column, 8–12 mm. long and 6–10 mm. wide, the mid-lobe transversely subreniform, the anterior margin entire or sometimes shallowly emarginate, the central portion of the lip with a median constriction often prolonged into a short, broad isthmus confluent at the base with the oblong, obtuse, or triangular, rather auriculate lateral lobes, which are often somewhat reflexed, the disk with a prominent, more or less 4-parted, fleshy, erect, tuberculate crest. Column 2–3 mm. long, with large, spreading, unequally 2-lobed, lateral wings.

Florida and the West Indies; Mexico to Venezuela and Brazil.

CANAL ZONE: vicinity Fort Kobbe, on margins of mangrove swamps, sea level, *Allen 2754*. PANAMÁ: margin of the Pacific Ocean, northwest of Panama City, on slope of hill rising from the sea, *Powell 1*. CHIRIQUÍ: near city of David, sea level, *Powell 270*.

A rather variable species closely allied to *Oncidium guttatum* (L.) Rchb. f., widely distributed in the lowlands of the American tropics. Most of the available specimens from Panama would correspond fairly well to the concept of *O. carthaginense* var. *Oerstedii*, yet the supposed differences (shorter lip, longer isthmus, and brighter coloring) are found in an extensive series of specimens from the entire geographic range to merge imperceptibly with the type, leaving no clear-cut grounds for separation.

7. ONCIDIUM CHEIROPHORUM Rchb. f. in Bot. Zeit. 10:695. 1852.

Oncidium Dielsianum Kränzl. in Engler, Pflanzenr. IV, Fam. 50 (Heft 80):197, *t. 17, fig. F; a-b.* 1922.

Dwarf, caespitose, epiphytic herbs averaging 12–15 cm. in height, with ovoid to suborbicular, compressed, monophyllous or rarely diphyllous pseudobulbs 1.5–3 cm. long and 1.4–2.5 cm. wide, at first smooth, often becoming finely wrinkled with age, the bases enveloped in several imbricating bracts the uppermost 2 or 3 of which are conspicuously foliaceous. Leaves linear-ligular, obtuse to subacute, pergameneous, 5–15 cm. long and 0.8–1.4 cm. wide, contracted below into short, conduplicate petioles. Inflorescences 1 or 2 slender, erect or arching, densely paniculate scapes usually exceeding the leaves, up to about 30 cm. in length, produced from the lateral bases of the pseudobulbs. Flowers small, averaging 1–1.5 cm. in diameter, bright yellow and fragrant. Sepals of about equal length, the dorsal sepal erect, shortly clawed at the base, the orbicular blade deeply concave,

often with a minute apicule, about 5 mm. long and 4 mm. wide, the lateral sepals elliptic-obovate, obtuse, often reflexed, apparently very shortly connate at the base, 5–6 mm. long and 3–3.5 mm. wide. Petals shortly clawed, spreading, obovate-spatulate, obtuse, about 4–5 mm. long and 4 mm. wide. Lip conspicuously 3-lobed, averaging about 8 mm. long and 12 mm. wide, the sessile base adnate to the base of the column, the broadly spreading, auriculate, lateral lobes subquadrate to suborbicular, usually with reflexed margins, the central portion of the lip with an abrupt, narrow constriction, the mid-lobe transversely subreniform or 2-lobed, the lobules often porrect in natural position, the disk with a prominent, fleshy keel, the upper margins with 2 conspicuous subquadrate wings, between which at the apex there is a short membranaceous hood or concavity. Column very short, with large obovate, usually porrect, lateral wings, the base produced in front into a prominent, erect, fleshy horn. Anther with a long beak, otherwise typical of the genus.

Costa Rica, Panama, and Colombia.

COCLÉ: El Valle de Antón, 500–1000 m., *D. Allen 3987*, *Hunter & Allen 350*, *Allen 236*, *1681*, *2914*, *2939*, *4211*. CHIRIQUÍ: without definite locality, 5000 ft., *Powell 54*; Volcancitos, 5500 ft., *Davidson 1261*; Piedra de Lino, 1600 m., *Killip 3571*; valley of the upper Río Chiriquí Viejo, near Monte Lirio, 1300–1900 m., *Seibert 224*; trail from Paso Ancho to Monte Lirio, Río Chiriquí Viejo, 1500–2000 m., *Allen 1499*.

A small-flowered, dwarf, but attractive species very common in the highlands of Coclé and Chiriquí provinces in our area, where the plants often form dense clumps in the tops of tall trees or on the ends of spreading branches, often fully exposed to the sun.

8. ONCIDIUM CRISTA-GALLI Rchb. f. in Bot. Zeit. 10:697. 1852.

Oncidium iridifolium Lindl. in Bot. Reg. 22: *t. 1911*. 1836, non HBK.
Oncidium decipiens Lindl. Folia Orch. Oncidium, (22). 1855.

Dwarf, caespitose, epiphytic herbs less than 10 cm. tall, with small, ovoid, compressed pseudobulbs 10–20 mm. tall and 8–18 mm. wide, the apices with a single very short, conduplicate, ensiform, abortive leaf sometimes reduced to a very abbreviated foliaceous apicule, 2–15 mm. long and 1–2 mm. wide, the bases of the pseudobulbs almost completely enveloped by the distichously imbricating, conduplicate bases of 4 to 6 conspicuous, foliaceous bracts, the blades ligular, acute, pergameneous, 2–8 cm. long and 0.5–1.0 cm. wide, usually explanate but sometimes conduplicate and ensiform. Inflorescences 1 to 4 erect or arching, filiform, 1-flowered scapes about equaling the leaves in length, produced from the axils of the foliaceous bracts, the peduncles provided with 3 or 4 distant, perfoliate, acuminate, spathaceous bracts 6–10 mm. long and about 3 mm. broad. Flowers very large in relation to the size of the plant, 2–3 cm. long and 1.8–2.2 cm. wide. Sepals free, spreading, the dorsal sepal erect, elliptic-ovate, slightly concave with a dorsal keel, terminating in a short apicule, the blade greenish yellow, 5–6 mm.

Fig. 201. *Oncidium crista-galli*

long and 3–4 mm. wide, the lateral sepals very inconspicuous, appressed to the back of the lip, rather obliquely linear-ligular, acuminate, greenish yellow, 5–6 mm. long and 2–2.5 mm. wide. Petals broadly spreading, oblong, rather obliquely obtuse and apiculate, bright yellow with transverse bands of reddish brown, the margins often undulate, 8–10 mm. long and 4–5 mm. wide. Lip complexly 3-lobed, 1.5–2.2 cm. long and 1.7–2.2 cm. wide, bright yellow, the margins undulate, the base shortly contracted and adnate to the base of the column, the lateral lobes spreading, obovate-spatulate, the dilated suborbicular blades 7–8 mm. long and 6–8 mm. wide, the mid-lobe much broader at the base than at the apex, divided into 4 lobules, the lateral basal pair rounded and spreading, the apical pair projecting, obliquely cuneate, separated by a deep central sinus, the disk convex, white with reddish brown blotches, with a prominent, spreading, fleshy, suborbicular plate and ruffled and crisped margins, subtended on each side by semicircular, crisped extensions, the apex terminating in a short, complex, crisped, fleshy hood. Column very short, about 3 mm. long, with conspicuous, lateral, dolabriform wings.

Mexico to Colombia and Peru.

COCLÉ: mountains beyond La Pintada, 400–600 m., *Hunter & Allen 588;* El Valle de Antón, 600–1000 m., *D. Allen 5158, Allen & Allen 1251, 1675, 2883, 3809.*

A remarkable, attractive, dwarf species of the wet highland forests of Coclé Province, with relatively large, bright yellow flowers, the plants superficially reminiscent of those of *Oncidium pusillum*, but readily distinguished by the presence of small suborbicular pseudobulbs and the filiform, rather than complanate, scapes.

9. ONCIDIUM EBRACHIATUM A. & S. in Sched. Orch. 8:75, *fig. 6.* 1925.

Pendulous, epiphytic herbs with fleshy, terete, longitudinally sulcate, acuminate leaves up to about 60 cm. in length, the plants identical in appearance with those of *Oncidium stipitatum*. Inflorescences usually solitary, arching, many-flowered panicles, produced from the bases of the plants. Flowers very small for the genus, about 1 cm. in length, the sepals and petals spotted with reddish brown, the lip yellow on both surfaces. Sepals free, spreading, the dorsal sepal suborbicular, strongly concave, incurving over the column, with an obscure, terminal apicule, the blades 3–3.5 mm. long and about 2.5 mm. wide, the lateral sepals obovate-spatulate, obtuse, minutely apiculate, the blades somewhat concave and incurving, about 4 mm. long and 2–2.2 mm. wide. Petals widely spreading, rather obliquely elliptic-oblong, obtuse, about 4 mm. long and 2–2.1 mm. wide. Lip pandurate, 3-lobed, about 8 mm. long and 6 mm. wide, the sessile base adnate to the base of the column, the lateral lobes subfalcate, obtuse, spreading, or with the apices somewhat antrorse in natural position, the lower margins confluent with the narrow central isthmus, the mid-lobe dilated and emarginate, flabellate-reniform in outline, often porrect in natural position, the minutely papillose disk with a broad, fleshy, flat, lunate, porrect plate below the column, terminating below the apex in a central, subtrilobed tubercle, on each side of which are lightly converging keels, terminating in low tuberculate swellings. Column very short and stout, about 1 mm. long, without prominent lateral wings.

Panama.

PANAMÁ: without definite locality, *M. D. Hunter s. n.*; coastal swamps east of Panama City, between the Jagua Hunt Club and Congor Hill, sea level, *Hunter & Allen 471*; San José Island, Perlas Archipelago, *Johnston 1340*. DARIÉN: Cana and vicinity, 2000–6500 ft., *R. S. Williams 975*; Río Tuira, near Pinogana, 100 ft., *Allen 4309*.

A small-flowered, terete-leaved species very closely allied to *O. nudum* Lindl. of South America; apparently confined to the lowlands of the eastern half of Panama.

10. ONCIDIUM ENSATUM Lindl. in Bot. Reg. n. s. 5: Misc. 17. 1842.

Oncidium cerebriferum Rchb. f. in Bot. Zeit. 10:696. 1852.
Oncidium confusum Rchb. f. in Xenia Orch. 1:234. 1858.

Erect, terrestrial herbs with fleshy, ovoid, somewhat compressed, usually smooth pseudobulbs 5.5–8 cm. tall and 3.5–5 cm. wide, the truncate apices with 1 to 3 leaves, the bases enveloped in 4–6 imbricating bracts the uppermost 2 or 3 of which are conspicuously foliaceous, the blades persistent, not articulated and not separating by a suture near the base. Leaves and bract blades linear-lanceolate, acuminate, subcoriaceous, 45–90 cm. long and 2–3 cm. wide, rather rigidly erect, with a strong central keel, the margins somewhat conduplicate, particularly for the lower half. Inflorescences 1 or 2 erect or arching, many-flowered panicles equaling or exceeding the leaves, produced from the lateral bases of the pseudo-

bulbs. Flowers of moderate size, in fresh material averaging about 3 cm. in diameter when spread out. Sepals subequal, free, spreading or reflexed, greenish or brownish olive, usually with undulant margins, the dorsal sepal oblanceolate, acute, 10–12 mm. long and 4–5 mm. wide, the lateral sepals lanceolate, acuminate, 13–15 mm. long and 3.5–4 mm. wide, with a pronounced dorsal keel. Petals subequal to the dorsal sepal and similarly colored, spreading or reflexed, with undulant margins, obliquely oblanceolate, acute, 12–14 mm. long and 4–5 mm. wide. Lip panduriform, 3-lobed, bright yellow, about 1.5 cm. long and 1.5 cm. wide, abruptly contracted at the base and adnate to the base of the column, the small lateral lobes oblong, obtuse or obscurely auriculate, the anterior margins confluent with the margins of the broad central isthmus, the mid-lobe dilated, 2-lobed, transversely subreniform, the disk olive-green, with a prominent, fleshy, white, 7-toothed callus. Column short, with prominent, lateral wings.

British Honduras to Panama.

PANAMÁ: foothills east of Panama City, sea level, *Powell 267;* vicinity Juan Díaz, *Powell 3484;* in low thick scrub, along Río Tecúmen, east of Panama City, about 30 m., *Hunter & Allen 266, Allen 5159.*

A fairly common terrestrial species of the Pacific slope, often found growing in low scrub in association with *Peristeria elata,* or sometimes in open grassland. In herbarium specimens, the species considerably resembles *Oncidium panamense,* but may be distinguished readily by the narrower basal callus, the terrestrial habit, and in the complete lack of articulations near the bases of the foliaceous bracts.

11. ONCIDIUM GLOBULIFERUM HBK. Nov. Gen. & Sp. 1:347. 1815.

Oncidium scansor Rchb. f. in Linnaea 22:844. 1849.
Oncidium convolvulaceum Lindl. in Paxt. Flow. Gard. 1:102, sub *t. 21.* 1850-51.
Oncidium globuliferum HBK. var. *costaricense* Rchb. f. in Gard. Chron. 1678. 1871.
Oncidium Wercklei Schltr. in Fedde Rep. Sp. Nov. Beih. 19:68: 1923.

Epiphytic herbs with solitary or clustered, elliptic-oblong to suborbicular, compressed, monophyllous pseudobulbs 1.2–2.5 cm. long and 1–2 cm. wide, very distantly distributed along the slender, flexuose, scandent rhizomes, the bases of the pseudobulbs partially enveloped in the conduplicate bases of several distichously imbricating bracts the uppermost pair of which being conspicuously foliaceous. Leaves elliptic-oblong to elliptic-lanceolate, obtuse to subacute, coriaceous, 2.5–6 cm. long and 1–2 cm. wide, contracted below into very short, conduplicate petioles. Inflorescences 1 or 2 short, erect, 1-flowered scapes about equaling the leaves in length, produced from the lateral bases of the pseudobulbs. Flowers very large in relation to the size of the plant, 2.5–3 cm. long and 2–2.5 cm. wide. Sepals free, spreading, yellow barred with reddish brown, the dorsal sepal elliptic-oblong, shortly acute, 8–12 mm. long and 4–5 mm. wide, the lateral sepals rather obliquely lanceolate, acute, 10–12 mm. long and 3–4 mm. wide. Petals somewhat broader than the sepals, yellow with reddish brown bars, elliptic-oblong, obtuse to subacute, 10–12 mm. long and 5–6 mm. wide. Lip 3-lobed, broadly spreading,

Fig. 202. *Oncidium globuliferum*

1.7–2 cm. long and 2–2.5 cm. wide, abruptly contracted at the base and adnate to the base of the column, the small subquadrate, auriculate, obtuse, lateral lobes spreading, the anterior margins confluent with the margins of the short, broad, central isthmus, the mid-lobe spreading, emarginate, 2-lobed, broadly and transversely reniform, bright yellow, about $\frac{2}{3}$ the total length of the lip, the disk with a more or less triangular, 7-toothed, fleshy callus. Column short, about 5 mm. long, with a pair of spreading lateral wings.

Costa Rica to Venezuela and Peru.

COCLÉ: region north of El Valle de Antón, 1000 m., *Allen 5201*. CHIRIQUÍ: vicinity Bajo Mono and Quebrada Chiquero, 1500 m., *Woodson & Schery 572;* without definite locality, 5000 ft., *Kiesuetter s. n.;* vicinity Cerro Punta, headwaters of the Río Chiriquí Viejo, 2000 m., *Allen 1567*.

Unique among the Oncidiums of Panama in having elongate, slender, flexuose rhizomes, the plants often forming large tangled colonies in the tops of tall trees in the wet highland forests. They are seldom seen except as fragments which have fallen from above, usually being rendered conspicuous by the yellowish rhizomes which superficially resemble the stems of a dodder. The solitary flowers are bright yellow, very large in relation to the size of the plant, often exceeding the pseudobulbs in diameter.

12. ONCIDIUM HETERANTHUM Poepp. & Endl. Nov. Gen. & Sp. 1:34, *t. 60*. 1836.

Oncidium bryolophotum Rchb. f. in Gard. Chron. 738. 1871.
Oncidium ionops Cogn. & Rolfe in Jour. des Orchid. 3:346. 1892.
Oncidium megalous Schltr. in Fedde Rep. Sp. Nov. 9:30. 1910.

Erect, caespitose, epiphytic herbs with linear or narrowly ovoid, rather compressed pseudobulbs up to about 5 cm. tall and 2 cm. wide, the truncate apices with 1 or 2 leaves, the bases enveloped in several imbricating bracts the uppermost 2 of which are conspicuously foliaceous. Leaves narrowly linear to elliptic-lanceolate, acute, subcoriaceous, 4–18 cm. long and 0.8–3.5 cm. wide, contracted below into very short conduplicate petioles. Inflorescences 1 or 2 slender, erect or arching panicles usually much exceeding the leaves, up to about 75 cm. long. Flowers dimorphic, each lateral branch of the inflorescences terminating in a single normal flower averaging about 2 cm. long and 1.2 cm. wide, subtended by many very dissimilar, small, stelliform, abortive, sterile flowers. Perianth segments of the sterile flowers broadly spreading, narrowly linear to spatulate, yellowish, 3–4 mm. long, the lip generally entirely aborted. Normal flowers with the sepals free, elliptic-lanceolate to ligular, shortly acute to obtuse, the bases shortly clawed, the blades often with undulate margins, yellow blotched with reddish brown, 6–10 mm. long and 2–3 mm. wide. Petals elliptic-oblong to obliquely obovate-spatulate, obtuse to subacute, clawed at the base, yellow blotched with reddish brown, 7–10 mm. long and 2.5–3.5 mm. wide. Lip broadly panduriform, 10–12 mm. long and 10–15 mm. wide, subequally 4-lobed, the lateral lobes broadly triangular,

obtuse, or rounded, the anterior margins converging and forming a short isthmus or narrow, median constriction above the abruptly dilated, spreading, transversely reniform, 2-parted, bright yellow mid-lobe, the disk with an erect, fleshy, tuberculate callus terminating at the apex in 3 short teeth. Column short, 3–4 mm. long, with 2 very prominent lateral wings.

Costa Rica, Panama, Colombia, Peru, Bolivia, and probably adjacent territories.

CHIRIQUÍ: without definite locality, "On large trees, in dense shade", 5000 ft., *Kieswetter s. n.*, *Powell 48;* central valley of the Río Chiriquí Viejo, vicinity of New Switzerland, 1800–2000 m., *Allen 1381.*

A curious highland species distinguished by the abundant yellowish, stelliform, abortive florets, subtending the normal flowers on the branches of the paniculate inflorescences.

13. ONCIDIUM ISTHMI Schltr. in Fedde Rep. Sp. Nov. Beih. 17:84. 1922.

Robust, erect, epiphytic herbs with approximate, narrowly ovoid to linear-oblong, compressed, longitudinally ridged, usually diphyllous pseudobulbs 8.5–12 cm. long and 3–4 cm. wide, the lower portions enveloped in the conduplicate, distichously imbricating bases of 6–7 bracts, the uppermost 4–5 of which are conspicuously foliaceous. Leaves and bract blades linear-lanceolate, acute, subcoriaceous, 15–45 cm. long and 1.5–3.2 cm. wide, the foliaceous bracts articulated near the base, with a distinct suture, the blades ultimately deciduous. Inflorescences 1 or 2 erect or arching, many-flowered panicles up to about 1 m. in length, produced from the lateral bases of the pseudobulbs. Flowers of moderate size, 2.5–3 cm. long and 1.5–2.2 cm. wide. Sepals free, spreading, clawed at the base, yellow barred with brown, the dorsal sepal elliptic-oblong, acute, with undulate margins, 9–12 mm. long and 4–5 mm. wide, the lateral sepals obliquely oblong, subacute, with undulate margins, 10–13 mm. long and 4–5 mm. wide. Petals rather obliquely oblong, subacute, with undulate margins, yellow barred with brown, 10–12 mm. long and 4–5 mm. wide. Lip panduriform, 3-lobed, bright yellow, the small auriculate, lateral lobes subquadrate to suborbicular, the frontal margins abruptly contracted into a narrow central isthmus, the mid-lobe broadly dilated and 2-lobed, transversely reniform, occupying about $\frac{2}{3}$ of the total length of the lip, the disk brown, with an erect, compact, 7-toothed basal callus. Column short, about 4 mm. long, with prominent lateral wings.

Costa Rica and Panama.

CANAL ZONE: San Juan, upper Chagres River, sea level, *Powell 397.* PANAMÁ: without definite locality, sea level, *Fairchild s. n.*; vicinity Pacora, sea level, *Allen 3442.* DARIÉN: Río Sambú, 200 m., *Pittier 5569.*

Robust lowland epiphytes, vegetatively nearly identical with O. *panamense* and O. *Baueri* but readily distinguished by the larger, conspicuously expanded mid-lobe and the much narrower isthmus of the lip.

14. ONCIDIUM KRAMERIANUM Rchb. f. in Otto & Dietr. Allgem. Gartenzeit. 23:9. 1855.

Oncidium Papilio var. *Kramerianum* Lindl. Folia Orch. Oncidium, (56). 1855.
Oncidium nodosum Ed. Morren in Belg. Hortic. 24:258. 1874, in adnot.
Papiliopsis nodosus Ed. Morren loc. cit. 1874.
Oncidium papilioniforme Regel, in Act. Hort. Petrop. 6:292. 1880.
Oncidium Kramerianum var. *resplendens* Rchb. f. in Gard. Chron. 3:360. 1888.

Erect, caespitose, epiphytic herbs with suborbicular to subquadrate, truncate, compressed, more or less rugose, monophyllous pseudobulbs 2.5–4 cm. in diameter, the bases enveloped in several papery, imbricating bracts which soon weather away. Leaves elliptic-oblong, acute, persistent, rigidly coriaceous, 15–25 cm. long and 3.5–6.5 cm. wide, contracted below into very short, conduplicate petioles, the lower surfaces of the leaves often more or less suffused with purple and with a strong central keel, the upper surfaces deep green, sometimes mottled darker green or purple. Inflorescences 1 or 2 erect or arching, prominently jointed scapes up to about 75 cm. in length, produced from the lateral bases of the pseudobulbs, the nodes conspicuously swollen, each provided with an elongate, acute, tubular, papery sheath clasping the lower halves of the cylindric internodes, the apex of the scape with a subconic, acute, terminal "bud" made up of several very closely imbricating sheaths, representing a much condensed raceme, the 5–8 flowers produced singly in succession from the axils of the sheaths, each flower lasting about a week. After the initially produced raceme has been exhausted, the scapes frequently elongate from one of the upper nodes, and again produce a series of flowers so that any given scape may remain in flower for as much as a year. Flowers large and richly colored. Sepals free, the dorsal sepal and the petals similar, erect, narrowly linear-spatulate, acute, rich reddish brown, the upper portions with undulate margins, 5.5–8 cm. long and 0.5–0.7 cm. wide, the lateral sepals very dissimilar, narrowly clawed at the base, the blades abruptly dilated above the claw, obliquely elliptic-ovate, obtuse to subacute, subfalcately deflexed with strongly undulate margins, yellow heavily blotched with rich reddish brown, 3–5 cm. long and 1–2.5 cm. wide. Lip about equaling the lateral sepals in length, subpandurate, 3-lobed, 3–4.5 cm. long and 3–4.5 cm. wide, richly blotched reddish brown, the lateral lobes rounded, the basal third of the lip suborbicular to transversely oblong in outline, undulate-margined, the central portion with a deep median constriction, which may sometimes be prolonged into a short, broad isthmus, the mid-lobe very large, spreading, transversely subquadrate to suborbicular, with a conspicuous bright yellow central blotch, the margins very strongly undulate, the disk at the base of the lip with a prominent, fleshy, minutely papillose, 5-parted, tuberculate crest. Column 6–8 mm. long, with 2 prominent lateral wings above which are 2 elongate, linear processes, thickened at the apices into small blackish glands.

Costa Rica to Colombia and Ecuador.

A very handsome species, often cultivated for its large, richly colored flowers. Although no authentic specimens have been collected in Panama, it has been several times reported from our area, notably from the vicinity of Chiriquí Lagoon and

from the vicinity of Puerto Armuelles. Since it is fairly frequent in closely adjacent territory in both Costa Rica and Colombia, there is every reason to believe that it will eventually be collected somewhere in the intermediate area.

15. ONCIDIUM NEBULOSUM Lindl. in Bot. Reg. n. s. 4: Misc. 175. 1841.

Oncidium Geertianum Morren, in Ann. Soc. Roy. d'Agr. et Bot. Gand 4:55, *t. 179*. 1848.
Oncidium caesium Rchb. f. in Gartenfl. 75. 1854.
Oncidium Klotzschianum Rchb. f. in Walp. Ann. 6:802. 1861.

Erect, epiphytic herbs with short, fleshy, approximate, ovoid to suborbicular, somewhat compressed, diphyllous pseudobulbs up to about 4 cm. long and 3 cm. wide, the bases usually with 2 foliaceous bracts. Leaves and bract blades narrowly lanceolate, obtuse to subacute, subcoriaceous, 9–20 cm. long and 2–2.5 cm. wide, contracted below into short, conduplicate petioles. Inflorescences 1 or 2 slender, erect or arching, few-flowered racemes up to about 36 cm. long, produced from the lateral bases of the pseudobulbs. Flowers relatively large, up to about 5 cm. long and 3 cm. wide. Sepals free, subequal, usually reflexed, pale yellow to greenish yellow, shaded or spotted with red or purple, lanceolate, acute, the lateral sepals somewhat oblique, 1.2–1.5 cm. long and 3–5.5 mm. wide. Petals spreading, subequal to the sepals or a little broader, ligular to elliptic-lanceolate, obtuse to subacute, yellow or greenish yellow, shaded or spotted with red or purple, 1.2–1.5 cm. long and 0.4–0.7 cm. wide. Lip pandurate, 3-lobed, 2–2.5 cm. long and 2–2.5 cm. wide, bright yellow, the lateral lobes small, obliquely triangular or subquadrate, obtuse, the anterior margins contracted into a narrow isthmus, the mid-lobe abruptly and broadly dilated and 2-lobed, transversely reniform, the disk with a short, fleshy, 5-toothed callus. Column about 5 mm. long, with prominent lateral wings.

Mexico, Guatemala, and Panama.

Absent from recent collections, but cited by Lindley (Fol. Orch. Oncidium (48). 1855) as "Wild in Veragua, Chiriqui, at 4–5000 ft.—Warczewicz." Probably a rather doubtful record, since it is not known from adjacent Costa Rica, or from any of the other Central American countries south of Guatemala.

16. ONCIDIUM OBRYZATUM Rchb. f. in Bonplandia 2:108. 1854.

Oncidium obryzatoides Kränzl. in Engler, Pflanzen. IV, Fam. 50 (Heft 80):240. 1922.
Oncidium fulgens Schltr. in Fedde Rep. Sp. Nov. Beih. 17:83. 1922.
Oncidium varians Schltr. loc. cit. 19:151. 1923.
Oncidium Brenesii Schltr. loc. cit. 257. 1923.
Oncidium graciliforme C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 5:96. 1938.

Erect, epiphytic herbs with approximate, suborbicular, ovoid, or elliptic-oblong, compressed, monophyllous pseudobulbs 2.5–9 cm. tall and 0.8–3 cm. wide, usually conspicuously ridged and wrinkled, often spotted or suffused with dark brown or black, the lower portions enveloped in the conduplicate, distichously imbricating bases of several bracts, the uppermost 2–4 of which are conspicuously foliaceous, the plants very variable in size, 1–4.5 dm. tall. Leaves and bract blades elliptic-oblong, ligular or sometimes narrowly linear, subacute, coriaceous, 10–35 cm. long

and 0.8–3.5 cm. wide, contracted below into slender conduplicate petioles. Inflorescences usually solitary, erect or arching, many-flowered panicles apparently always exceeding the leaves, in robust plants up to 1.5 m. in length, although often much less, in our specimens averaging about 4.5–6 dm. long. Flowers very variable in size, 1.5–3.5 cm. long and 1–2.5 cm. wide. Sepals subequal, free, spreading, obovate-spatulate, obtuse or truncate, golden yellow with chestnut-brown blotches at the base, 6–14 mm. long and 2.5–5 mm. wide. Petals usually broader than the sepals, obovate-spatulate, obtuse or truncate, golden yellow with basal chestnut-brown blotches, 6–12 mm. long and 3–6 mm. wide. Lip pandurate, 3-lobed, 10–20 mm. long and 8–20 mm. wide, golden yellow with a U-shaped reddish brown blotch surrounding the yellow basal callus, the lateral lobes subquadrate, obliquely triangular or rounded, the basal $\frac{2}{5}$ of the lip roughly triangular to suborbicular, the central portion of the lip abruptly contracted into a short, narrow isthmus, the mid-lobe dilated, spreading, 2-lobed with a deep central sinus, often transversely reniform in outline, the disk with an erect, fleshy basal crest, sometimes 5 (or more)-lobulate with 3 distinct apical teeth, or obscurely lobulate with only 2 distinct apical lobes. Column 3–4 mm. long, with prominent, usually porrect, lateral wings, the apices often more or less converging over the anther.

Costa Rica, Panama, Colombia, Ecuador, and Peru.

COCLÉ: region north of El Valle de Antón, 800–1000 m., *Allen 225, 2923, 2938, 3424.* CHIRIQUÍ: without definite locality, 4000–5000 ft., *Powell 3158, 3159, 3160, 3227;* vicinity Boquete, *Svihla s. n.*

A common, very variable species of the tree tops of areas of wet highland forest, distinguished from most other Panama Oncidiums by the obovate-spatulate, usually truncate sepals and petals.

17. ONCIDIUM OCHMATOCHILUM Rchb. f. in Bot. Zeit. 10:698. 1852.

Oncidium cardiochilum Lindl. Fol. Orch. Oncidium, (27). 1855.

Erect, usually robust, epiphytic herbs up to about 75 cm. tall, the many, conduplicate, distichously imbricating bases of the foliage contracted into a complanate petiole, often completely enveloping the usually inconspicuous, compressed, narrowly ovoid, diphyllous pseudobulb which may be up to about 10 cm. long and 2.5 cm. wide. Leaves narrowly lanceolate, acute to acuminate, coriaceous with prominent veins, sometimes conduplicate for their entire length, more frequently explanate, 25–70 cm. long and 1.5–6 cm. wide. Inflorescences 1 or 2 stout, erect or arching, many-flowered panicles up to about 2 m. in length but sometimes much shorter, produced from the axils of the uppermost basal leaves, the terminal portion of the inflorescence and the lateral branches distinctly fractiflex. Flowers of moderate size, averaging about 3 cm. long and 2 cm. wide when spread out, with a strong lilac-like fragrance when fresh. Sepals free, pale green marked with brown, the dorsal sepal lanceolate, acuminate, often strongly reflexed, 1.5–2 cm. long and 0.3–0.4 cm. wide, the lateral sepals obliquely linear-lanceolate, acuminate, the dorsal surface with a prominent central keel, 1.5–2 cm. long and

0.3–0.4 cm. wide. Petals broader than the sepals, elliptic-lanceolate, acute, brown or greenish brown, sometimes mottled white or with paler apices, 1.3–1.7 cm. long and 0.4–0.55 cm. wide. Lip panduriform, 3-lobed, 1–1.3 cm. long and 1–1.3 cm. wide, white spotted with brown or reddish purple at the base, the lateral lobes subquadrate, obtuse, projecting, the base of the lip subequal to, or sometimes exceeding the mid-lobe in width, the central portion contracted into a short distinct isthmus, the mid-lobe abruptly dilated, entire or apiculate, transversely semiorbicular or subcordate, the disk with a prominent, fleshy, multi-tuberculate callus terminating at the apex in a short, erect, obtuse, laterally compressed keel above and below which are 2 pairs of short fleshy teeth. Column 5–6 mm. long, apparently without lateral wings, the base without a foot.

Guatemala, Costa Rica, Panama, Colombia, Peru, and probably adjacent territories.

COCLÉ: El Valle de Antón, 3600 ft., *A. Bouché 9*. CHIRIQUÍ: without definite locality, 4500 ft., *Powell 160*.

The plant collected by Mr. Bouché was reported to have been a massive specimen weighing in the neighborhood of fifty pounds, with nearly a thousand flowers evidently borne on several inflorescences, the fragrance having been perceptible for some considerable distance.

18. ONCIDIUM PANAMENSE Schltr. in Fedde Rep. Sp. Nov. Beih. 17:85. 1922.

Erect, robust epiphytic herbs with approximate, oblong-ovoid, compressed, strongly ridged, diphyllous pseudobulbs 6–16 cm. long and 2–6 cm. wide, enveloped below in the conduplicate, distichously imbricating bases of 3–4 elongate, foliaceous bracts. Leaves and bract blades linear-lanceolate, acute, subcoriaceous, 12–75 cm. long and 1.5–4 cm. wide, contracted below into elongate, conduplicate petioles. Inflorescences 1 or 2 erect, arching, pendulous or sometimes scandent, many-flowered panicles 1–3.5 m. in length, produced from the lateral bases of the pseudobulbs. Flowers of moderate size averaging about 2.5 cm. in diameter. Sepals free, subequal, spreading, shortly clawed at the base, yellow heavily barred and blotched olive-brown, elliptic-obovate, acute, with somewhat undulate margins, 10–13 mm. long and 4–5 mm. wide. Petals subequal to the sepals and similarly colored, spreading, often with recurved apices, elliptic-obovate to elliptic-lanceolate, acute, with somewhat undulate margins, 10–12 mm. long and 4–5 mm. wide. Lip obscurely 3-lobed, broadly pandurate, yellow with a large, transverse, reddish brown to yellowish brown blotch below the crest, the lip 10–15 mm. long and 10–15 mm. wide, the lateral lobes rounded or broadly and obtusely triangular, the central lip with a sharp constriction but without a distinct isthmus, the mid-lobe emarginate, obscurely 2-lobed, transversely oblong or subreniform, the basal and apical halves of the lip of about equal width, the disk with an erect, white, fleshy crest surmounted by 4 divergent, usually crenulate keels, terminating at the apex in 3 distinct fleshy teeth. Column short, 3–5 mm. long, with 2 prominent, spreading, usually serrate, lateral wings.

Panama.

CANAL ZONE: San Juan, upper Chagres River, sea level, *Powell 416, 3201.* PANAMÁ: hills east of Panama City, sea level, *Powell 3228;* without definite locality, 50 m., *Kieswetter s. n.;* San José Island, Perlas Archipelago, *Erlanson 209;* vicinity Pacora, 25 m., *G. Fairchild s. n.;* vicinity Chepo, 20 m., *Allen 2360.*

A very common, robust, lowland species closely allied to the widely distributed Central American *O. sphacelatum,* but apparently differing in the broader basal callus and the larger column wings. Among the vegetatively similar or identical local species, it is separable from *O. isthmi* and *O. Baueri* by the uniformly broader basal half of the lip and the absence of a true isthmus, and from *O. ensatum* by the epiphytic habit and the presence of distinct articulations near the bases of the foliaceous bracts.

19. ONCIDIUM PANDURIFORME A. & S. in Sched. Orch. 8:77. 1925.

Erect, caespitose, epiphytic herbs 35–55 cm. tall, with distichous foliage, the conduplicate, imbricating bases enveloping a small, linear to narrowly ovoid, compressed, 1- or 2-leaved pseudobulb 5–7 cm. long and 0.8–2 cm. wide, the plants reminiscent of those of *Oncidium ochmatochilum.* Leaves linear-lanceolate, acute, subcoriaceous, rather coarsely veined, the blades up to about 40 cm. long and 1.5–3 cm. wide. Inflorescences usually solitary, stout, erect or arching, many-flowered panicles much exceeding the leaves, up to about 1 m. in length, produced from the axils of the foliaceous bracts, the terminal portion and the lateral branches usually distinctly fractiflex. Flowers rather small, averaging about 2 cm. in diameter. Sepals subequal, free, spreading or strongly reflexed, yellowish brown with yellow apices, the dorsal sepal lanceolate, acute, 9–12 mm. long and 2.5–3 mm. wide, the lateral sepals linear-lanceolate, acute, 10–12 mm. long and 2–2.5 mm. wide, the reverse surfaces with prominent central keels. Petals usually broader than the sepals, similarly colored, elliptic-lanceolate, acute, spreading or reflexed, 9–10 mm. long and 4–5 mm. wide. Lip pandurate, obscurely 3-lobed, white, 9–12 mm. long and 8–10 mm. wide, the lateral lobes small and rounded or obtusely triangular, the anterior margins converging to form a short, broad isthmus, the mid-lobe abruptly dilated, spreading, transversely semiorbicular, the under-surface at the apex with a short, strongly developed keel terminating in an apicule, the disk with a low, fleshy, obscurely tricarinate callus at the base. Column about 5 mm. long, without lateral wings but with 2 pronounced, parallel, marginal thickenings on the under-surface below the stigma.

Costa Rica and Panama.

CHIRIQUÍ: vicinity Bajo Chorro, headwaters of the Río Caldera, 1900 m., *Woodson & Schery 704.*

Apparently closely allied to *Oncidium ochmatochilum,* but differing in the obscure, lateral lobes of the lip, and the much less complexly developed basal callus.

20. ONCIDIUM PARVIFLORUM L. Wms. in Amer. Orchid Soc. Bull. 11:33. 1942.

Small, erect, epiphytic herbs, with approximate, elliptic-oblong, compressed, longitudinally ridged, monophyllous pseudobulbs 5–7 cm. long and 2–3 cm. wide,

densely spotted or suffused with brown, enveloped below in the conduplicate, distichously imbricating bases of several bracts, the uppermost 2 of which are conspicuously foliaceous. Leaves and bract blades ligular, obtuse, subcoriaceous,

Fig. 203. *Oncidium parviflorum*

11–13 cm. long and 1.2–1.6 cm. wide, contracted below into narrow, conduplicate petioles. Inflorescences solitary, erect or arching, many-flowered panicles up to about 75 cm. long, produced from the lateral bases of the pseudobulbs, the lateral branches very short, 1- to 3-flowered. Flowers small, 1.2–1.5 cm. in diameter. Sepals free, spreading, shortly clawed at the base, brown with yellow tips, the dorsal sepal elliptic-oblong, obtuse, shortly apiculate, 5–6 mm. long and about 3 mm. wide, the lateral sepals rather obliquely lanceolate, acute, with prominent dorsal keels, about 6 mm. long and 2.5 mm. wide. Petals clawed at the base, somewhat broader than the sepals, spreading, brown with yellow tips, oblong-ovate, obtuse, about 6 mm. long and 3.5 mm. wide. Lip pandurate, 3-lobed, 8–9 mm. long and 5–6 mm. wide, the frontal and lateral lobes yellow, the isthmus brown, the lateral lobes small, auriculate, with subacute deflexed apices, the central portion of the lip abruptly contracted into a broad isthmus, the mid-lobe emarginate and 2-lobed, subreniform, slightly exceeding the lateral lobes in width, the disk with a prominent, pubescent, 4-lobulate callus at the base, at first pure white, becoming yellow with age. Column about 3 mm. long, with 2 prominent lateral wings, which are rounded below and produced above into 2 erect, parallel, acuminate processes on either side of the anther.

Panama.

COCLÉ: region north of El Valle de Antón, about 1000 m., *Allen 2937*.

A small-flowered species, found in the tops of tall trees in the wet highland forests north of El Valle de Antón, in Coclé Province. Known only from the type collection.

21. ONCIDIUM POWELLII Schltr. in Fedde Rep. Sp. Nov. Beih. 17:86. 1922.

Erect, epiphytic herbs, with approximate, oblong-ovoid, compressed, longitudinally ridged, monophyllous pseudobulbs 6–13 cm. long and 2.5–5 cm. wide, partially enveloped below in the conduplicate, distichously imbricating bases of 3–4 foliaceous bracts. Leaves and bract blades oblong-lanceolate to ligular, usually obtuse or slightly retuse at the apex, or sometimes subacute, subcoriaceous, up to about 45 cm. in length but averaging about 20–25 cm. long and 2.5–5 cm. wide. Inflorescences usually solitary, arching, few- to many-flowered, flexuose panicles much exceeding the leaves, sometimes up to nearly 1.5 m. long but averaging about 7.5–9 dm., produced from the axils of the uppermost foliaceous bracts, each of the short lateral branches of the inflorescence with 1–3 flowers subtended by a few conspicuous, white, papery, spathaceous sheaths. Flowers variable in size but always large and attractive, 3–6 cm. in diameter. Sepals subequal, spreading, shortly clawed at the base, the blades with strongly undulate margins, rich chocolate-brown barred and margined yellow, the dorsal sepal free, erect, broadly elliptic-oblong to obovate, obtuse to subacute, 1.5–2.5 cm. long and about 1 cm. wide, the lateral sepals free or sometimes with the basal claws shortly connate, rather obliquely oblong, obtuse to subacute, 1.7–3 cm. long and 0.8–1.0 cm. wide.

Fig. 204. *Oncidium Powellii*

Petals spreading, with strongly undulate margins, subequal to the sepals or somewhat broader, the bases sessile, the blades rather obliquely oblong, obtuse to subacute, rich chocolate-brown with yellow margins and markings, 1.5–2.5 cm. long and 0.6–1.0 cm. wide. Lip pandurate, 3-lobed, shortly clawed at the base, 1.5–2 cm. long and 0.8–1.2 cm. wide, always distinctly shorter than the lateral sepals, the lateral lobes of the lip small, yellow, auriculate to subquadrate, truncate to subacute, the central portion of the lip contracted into a short, distinct, reddish brown isthmus, the mid-lobe bright yellow, quite variable in shape, usually shallowly emarginate, with a minute central apicule, the 2-lobed blade transversely reniform but sometimes only an obovate, obtuse, entire dilation of the isthmus, the disk with a prominent, yellow, multidenticulate callus, terminating at the apex in a broad, transverse, porrect, more or less verrucose or crenulate plate. Column 5–6 mm. long, without conspicuous lateral wings.

Panama.

CANAL ZONE: Gatún Lake, sea level, *Powell 58*; without definite locality, *Pring s. n.*; hills near Frijoles, sea level, *Powell 3480*. COCLÉ: vicinity of El Valle de Antón, 800 m., *Allen 2895*.

An apparently rare species, with very handsome chocolate-brown flowers, seemingly confined to the lowland forests of the Atlantic slope. It is very closely allied to the Colombian O. *anthocrene*, and may ultimately prove to be identical.

22. ONCIDIUM PUSILLUM (L.) Rchb. f. in Walp. Ann. 6:714. 1863.

Epidendrum pusillum L. Sp. Pl. ed. 2, 1352. 1763.
Cymbidium pusillum Sw. in Nov. Act. Soc. Upsal. 6:74. 1799.
Oncidium iridifolium HBK. Nov. Gen. & Sp. 1:344. 1815.

Dwarf, epiphytic herbs up to about 8 cm. tall, entirely without pseudobulbs. Leaves distichously spreading, forming a broad fan, equitant, linear, often falcate or ensiform, the apices obliquely acute, 2–6 cm. long and 0.4–1.0 cm. wide. Inflorescences 1 to about 6 erect or arching scapes, about equaling the leaves in length, the apices with several acute, strongly compressed, imbricating sheaths, forming a short, complanate raceme from the axils of which the flowers are produced in succession. Flowers large in relation to the size of the plant, averaging 2–2.5 cm. long and 1.8–2 cm. wide. Sepals free, spreading, bright yellow, the dorsal sepal erect, elliptic-lanceolate to subquadrate, obtuse, up to about 5 mm. long and 3–4 mm. wide, the dorsal surface with a pronounced keel, prolonged at the apex into an erect, acute spur, the lateral sepals linear-lanceolate, acuminate, very closely appressed to the under-surface of the lip, 4–5 mm. long and 1–1.5 mm. wide, the reverse surfaces with a strongly developed keel. Petals spreading, oblong, obtuse, with undulate margins, bright yellow irregularly barred with reddish brown, up to about 8 mm. long and 4 mm. wide. Lip broadly pandurate, 3-lobed, up to 1.8 cm. long and 2 cm. wide, bright yellow, the lateral lobes suborbicular to obovate-spatulate, obtuse, spreading, the central portion of the lip contracted into a short, broad isthmus, blotched with reddish brown, the mid-lobe

Fig. 205. *Oncidium pusillum*

abruptly dilated, with a deep central sinus, the lateral lobules broadly spreading, with undulate margins, the disk white, spotted reddish orange, with a spreading, subquadrate plate, terminating in a second broad, spreading, semi-orbicular plate with a short central keel and undulate margins. Column short, about 3 mm. long, with prominent, denticulate, lateral wings.

Mexico to Brazil and Bolivia; Trinidad.

CANAL ZONE: Las Cascadas Plantation, near Summit, *Standley 25761, Powell 3018;* San Juan, upper Chagres River, sea level, *Powell 3346;* drowned forest along the Río Chagres, upper Madden Lake area, *Steyermark & Allen 16771;* vicinity Salamanca Hydrographic Station, 80 m., *Woodson, Allen & Seibert 1559;* vicinity Alajuela, 90–100 m., Madden Dam area, *Dodge, Steyermark & Allen 16510.* PANAMÁ: Río La Maestra, between the Río Bayano and the Gulf of San Miguel, 0–25 m., *Allen 17.* BOCAS DEL TORO: Water Valley, vicinity Chiriquí Lagoon, *von Wedel 1383, 1474, 1482, 2153;* Western River, vicinity Chiriquí Lagoon, *von Wedel 2777;* Almirante Bay, *von Wedel 14.*

Attractive plants, with relatively large, bright yellow flowers, often found as colonies on old orange trees or scattered through the slender, twiggy ends of dead branches, often overhanging water. Widely distributed and common in the American tropics.

23. ONCIDIUM STENOTIS Rchb. f. in Linnaea 41:67. 1877.

Erect, epiphytic herbs with approximate, linear-oblong, compressed, longitudinally ridged, monophyllous pseudobulbs 7–14 cm. long and 2.5–4 cm. wide, the lower portions enveloped in the conduplicate, distichously imbricating bases of several bracts the uppermost 3 of which are conspicuously foliaceous. Leaves and bract blades linear-oblong, obtuse to subacute, coriaceous, 15–60 cm. long and 2.5–5 cm. wide, contracted below into very short, conduplicate petioles. Inflorescences 1 or 2 erect or arching, few- to many-flowered panicles up to about

1.5 m. in length, the lateral branches short, usually less than 15 cm. long, the 1 to 5 flowers subtended by thin, white, acuminate, papery bracts. Flowers of moderate size, 3–4 cm. in diameter. Sepals free, subequal, spreading, with recurved apices and undulate margins, yellow heavily blotched with brown, the dorsal sepal oblong-lanceolate, shortly acute to apiculate, 1.3–1.8 cm. long and 0.6–0.8 cm. wide, the lateral sepals linear-lanceolate to lanceolate, acute, obliquely deflexed, the reverse surfaces with a strong central keel, 1.5–2 cm. long and 0.5–0.7 cm. wide. Petals subequal to the sepals and similarly colored, spreading, with recurved apices and undulate margins, lanceolate, acute, 1.4–1.6 cm. long and 0.4–0.6 cm. wide. Lip pandurate, 3-lobed, distinctly shorter than the lateral sepals, 1.2–2 cm. long and 1.2–1.8 cm. wide, bright yellow with a brown isthmus, the lateral lobes shortly clawed at the base, spreading, obovate-spatulate, with subquadrate to suborbicular blades, the central portion of the lip contracted into a narrow isthmus, the mid-lobe abruptly dilated, emarginate and 2-lobed, often with a short central apicule, transversely subreniform in outline, about equaling the extended lateral lobes in width, the disk with an erect, fleshy callus, the sides with 2 or 3 short teeth, the apex abruptly tridenticulate. Column up to about 7 mm. long, with 2 rather obscure lateral lobes, the under-surface below the stigma conspicuously thickened into 2 parallel, fleshy lobules.

Costa Rica and Panama.

CHIRIQUÍ: without definite locality, *Pring s. n.*, *Pring & Hunter s. n.* BOCAS DEL TORO: Water Valley, vicinity Chiriquí Lagoon, *von Wedel 1654, 1829, 2156.*

Allied to *O. Baueri*, but apparently always differing in the larger flowers, in which the lip is distinctly shorter than the lateral sepals, and with a conspicuously narrower isthmus. The smaller plants are nearly identical in vegetative appearance with those of *O. Powellii*, and have sometimes been mistaken for that species.

24. ONCIDIUM STIPITATUM Lindl. in Bot. Voy. Sulphur, 172. 1843.

Oncidium lacerum Lindl. in Bot. Reg. n. s. 7: Misc. 30. 1844.
Oncidium stipitatum Lindl. var. *platyonyx* Rchb. f. in Gard. Chron. 1:788. 1878.

Caespitose, epiphytic herbs with very short, subcylindric to subconic, monophyllous pseudobulbs 5–10 mm. long and 5–10 mm. wide, the broadly truncate apices with elongate, fleshy, terete, acuminate, longitudinally sulcate leaves, the pseudobulbs and leaf bases of the current season's growth enveloped in 4–6 closely imbricating, papery bracts which soon weather away. Leaves at first horizontal or ascending, becoming pendulous and wrinkled with age, often more or less spotted with reddish brown, 24–70 cm. long and 0.6–1.0 cm. in diameter. Inflorescences solitary, horizontal or ascending, many-flowered panicles usually about equaling the leaves in length, produced from the bases of the pseudobulbs. Flowers very variable in size, up to about 2.5 cm. long and 1.8 cm. wide, always brightly colored and attractive. Sepals subequal, free, spreading, shortly clawed at the base, yellow richly marked with reddish brown, the dorsal sepal obovate-spatulate, obtuse with a minute apicule, the blade slightly concave, 4.5–6 mm.

Fig. 206. *Oncidium stipitatum*

long and 2.5–4 mm. wide, the lateral sepals obliquely obovate, shortly acute, 5–7 mm. long and 3–4 mm. wide. Petals spreading, elliptic-oblong, obtuse, with undulate margins, colored and marked similarly to the sepals, 5–8 mm. long and 2–3 mm. wide. Lip pandurate, 3-lobed, 1–2 cm. long and 1–1.8 cm. wide, bright yellow on both the frontal and reverse surfaces, the basal half of the isthmus reddish brown, the lateral lobes linear-oblong, obliquely obtuse, spreading or ascending, the central portion of the lip contracted into a narrow isthmus, the mid-lobe abruptly dilated and 2-lobed, transversely semiorbicular to oblong, often with undulate margins, the disk at the base with a suborbicular transverse plate terminating at the apex in a prominent, erect, fleshy, semiorbicular, somewhat laterally compressed tubercle occupying only the basal half of the isthmus. Column 2–2.5 mm. long, with 2 narrow, spreading, lateral arms.

Panama.

CANAL ZONE: vicinity of Empire and Culebra Cut, 80 m., *Hunter & Allen 784;* Miraflores, sea level, *Powell 3207;* Las Cruces, *Powell 3222;* Las Cascadas, *Powell 3124;* Barro Colorado Island, Gatún Lake, *Woodworth & Vestal 529;* San Juan, upper Chagres River, 0–200 ft., *Powell 3137.* COLÓN: forests along the Río Boquerón, above the Peluca Hydrographic Station, Upper Madden Lake region, 90 m., *Hunter & Allen 654.* PANAMÁ: hills near Panama City and near Tapía, sea level, *Powell 220, 375;* vicinity Arraiján, *Powell 3209;* Chilibre River, *Piper s. n.;* coastal swamp along the Río Jagua, east of Panama City, sea level, *Hunter & Allen 472;* Cerro Campana, vicinity Campana, 2000 ft., *Fairchild s. n., Allen 4488;* vicinity Pacora, about 50 m., *Allen 819, 2933, 4451, 4457;* vicinity La Chorrera, 50 ft., *Allen 5168.*

A very common, attractive lowland species apparently confined to the central Isthmian area, particularly on the Pacific slope, where the plants are very abundant in areas of deciduous forest, with spontaneous seedlings often spreading to cultivated trees and shrubs of the Canal Zone town sites.

25. ONCIDIUM TERES A. & S. in Sched. Orch. 8:78, *t. 7.* 1925.

Epiphytic herbs with slender, fleshy, terete, longitudinally sulcate leaves. Inflorescences paniculate, many-flowered, up to about 4.5 dm. long, produced from the bases of the rudimentary, subcylindric pseudobulbs. Flowers small, up to about 1.5 cm. long and 1 cm. wide. Sepals free, subequal, spreading, shortly clawed at the base, obovate-spatulate, the blades suborbicular, obtuse, concave, minutely apiculate, yellow very heavily spotted reddish brown, about 6 mm. long and 3.5–4.5 mm. wide. Petals spreading, marked and colored similarly to the sepals, oblong-obovate, obtuse, with undulate margins, 5.2–6 mm. long and 3–4 mm. wide. Lip panduriform, 3-lobed, 7–8 mm. long and 6.5–8 mm. wide, the frontal surface bright yellow, the reverse surface and the disk heavily spotted reddish brown, the lateral lobes small, ligular or oblong-spatulate, obtuse to obliquely acute, minutely puberulent, antrorse in natural position, the central portion of the lip contracted into a distinct isthmus, the mid-lobe abruptly dilated, obscurely 2-lobed, transversely reniform, sometimes porrect in natural position, the disk with

Fig. 207. *Oncidium teres*

a prominent, complex, fleshy, tuberculate callus, occupying nearly the entire isthmus. Column about 3 mm. long, with 2 lateral, acute, incurving wings.

Panama.

VERAGUAS: vicinity San Francisco de Veraguas, 1000 ft., *Powell 383*. CHIRIQUÍ: vicinity David, 100 ft., *Allen 4242, 4453*.

A small-flowered lowland species thus far known only from Chiriquí and Veraguas provinces in western Panama. The plants are vegetatively identical with those of *Oncidium stipitatum*, but the flowers differ in the shorter isthmus of the lip, the much more prominent and complex basal callus, the reddish brown spotting on the reverse surface of the lip, and in other characters.

26. ONCIDIUM WARSCEWICZII Rchb. f. in Bot. Zeit. 10:693. 1852.

Oncidium bifrons Lindl. in Gard. Chron. 84. 1857.

Erect, caespitose, epiphytic herbs with approximate, elliptic-ovoid, compressed, usually diphyllous pseudobulbs 4–8 cm. tall and 2–3 cm. wide, the bases enveloped in several conduplicate, imbricating bracts, the uppermost bract being conspicuously foliaceous. Leaves ligular, obtuse to subacute, subcoriaceous, 15–30 cm. long and 1.5–3.5 cm. wide, contracted below into slender, conduplicate petioles. Inflorescence a solitary, erect or arching, 4- to 12-flowered, unilateral raceme exceeding the leaves, up to about 5 dm. long, produced from the axil of the uppermost foliaceous bract. Flowers of moderate size, about 3 cm. in diameter, uniformly yellow throughout, the elongate pedicels subtended by conspicuous, papery, spathaceous bracts. Sepals dissimilar, the dorsal sepal free, oblong, obtuse, with slightly undulate margins, 10–12 mm. long and 5–6 mm. wide, the lateral sepals connate nearly to the apex, forming a single obovate, bifid segment below the lip, the lower surface with 2 distinct keels, 1.4–1.6 cm. long and 0.7–0.9 cm. wide. Petals obliquely oblong, obtuse, with slightly undulate margins, 1.2–1.4 cm. long and 0.7–0.8 cm. wide. Lip subpandurate, obscurely 3-lobed, 1.5–1.8 cm. long and 1.5–1.8 cm. wide at the apex, the lateral lobes reduced to inconspicuous auricles, the basal half of the lip nearly oblong, the apical half abruptly dilated and 2-lobed, reniform, about twice as wide as the basal half, the disk with a nar-

row, fleshy crest, the base under the column semiterete, terminating at the apex in 5 short, divergent teeth. Column 8–10 mm. long, the apex dilated, with narrow lateral wings.

Costa Rica and Panama.

Originally described from plants collected by von Warscewicz, presumably on the slopes of Chiriquí Volcano, at 8000–10,000 ft. elevation. Although the species is not represented in recent collections from our area, its frequent occurrence in the adjacent Costa Rican highlands would lend weight to the supposition that this one citation may be authentic.

DOUBTFUL SPECIES

ONCIDIUM ADVENA Rchb. f. in Hamb. Gartenzeit. 16:422. 1860.

Originally described from flowering material only, from plants presumably imported from Venezuela. An Endres collection is cited by Kränzlin, from the vicinity of the old Obispo railway station, in the Canal Zone. The figure given of a single flower looks like *Oncidium ensatum*. Absent from all recent collections.

ONCIDIUM ONUSTUM Lindl. Gen. & Sp. Orch. Pl. 203. 1833.

A poorly known South American species, sometimes doubtfully listed as occurring in Panama. Absent from all recent collections.

ONCIDIUM PELIOGRAMA Linden & Rchb. f. in Gard. Chron. 1451. 1871.

Described from flowers only. On the basis of the sketch of the type in the Ames Herbarium, the species which we list as *Oncidium stenotis* might possibly be referable to this concept, but the drawing is too poor for positive identification. In the absence of authentic material for comparison, or even any description of vegetative parts, it seems best to exclude it as a species of doubtful identity.

79. LEOCHILUS Knowles & Westcott

LEOCHILUS Knowles & Westc. Fl. Cab. 2:143. 1838; Benth. & Hook. Gen. Pl. 3:564. 1883; Kränzl. in Engler, Pflanzenr. IV, Fam. 50 (Heft 80):291. 1922.

Cryptosanus Scheidw. in Otto & Dietr. Allg. Gartenzeit. 11:101. 1843.
Rhynchostele Rchb. f. in Bot. Zeit. 10:770. 1852.
Cryptosaccus Scheidw. ex Rchb. f. Xenia Orch. 1:15. 1854.
Leiochilus Benth. in Jour. Linn. Soc. 18:328. 1881, non Hook.
Waluewa Regel, in Gartenfl. 40:89, *t. 1341*. 1891.
Rhynchostelis Jackson, in Index Kew. 2:718. 1895, sphalm.

Small, caespitose, epiphytic herbs with short, compressed, monophyllous or rarely diphyllous pseudobulbs, the lower portions enveloped in several membranaceous or foliaceous sheaths. Leaves elliptic-lanceolate to ligular, coriaceous, contracted below into a petiole. Inflorescences 1 or 2 erect or arching racemes or panicles produced from the lateral bases of the pseudobulbs. Flowers small. Sepals subequal, spreading, free, or more or less connate. Petals subequal to the sepals or sometimes broader. Lip entire or 3-lobed, adnate to the base of the

column, spreading, usually longer than the lateral sepals, the disk fleshy or callous. Column short, erect, not laterally winged but usually biauriculate below the stigma, the clinandrium truncate, the rostéllum elongate, the base of the column without a foot. Anther terminal, operculate, incumbent, 1-celled, produced in front into a hooded appendage; pollinia 2, waxy.

A small genus of tropical American epiphytes closely allied to *Oncidium*, ranging from Mexico and the West Indies to northern Argentina. Two species are known from Panama.

a. Lateral sepals connate for more than half their length..... 1. L. LABIATUS
aa. Lateral sepals free..... 2. L. SCRIPTUS

1. LEOCHILUS LABIATUS (Sw.) O. Ktze. Rev. Gen. Pl. 2:656. 1891 (as *Leiochilus*).

Epidendrum labiatum Sw. Prodr. Veg. Ind. Occ. 124. 1788.
Liparis labiata Spr. Syst. Veg. 3:741. 1826.
Rodriguezia cochlearis Lindl. in Ann. & Mag. Nat. Hist. 5:116. 1840.
Leochilus cochlearis Lindl. in Bot. Reg. n. s. 5: Misc. 23. 1842.
Oncidium labiatum Rchb. f. in Walp. Ann. 6:741. 1863.

Dwarf, epiphytic herbs 4–9 cm. tall, with elliptic oblong, compressed, monophyllous pseudobulbs 10–15 mm. long and 5–8 mm. wide, the bases with 2–3 foliaceous bracts, the leaves and pseudobulbs often reddish brown. Leaves and bract blades elliptic-lanceolate to ligular, obtuse to subacute, coriaceous, 2–6 cm. long and 0.6–1.5 cm. wide. Inflorescences 1 or 2 slender, erect, few-flowered racemes or shortly branching panicles much exceeding the leaves in length, 4–25 cm. long. Flowers small, averaging about 1 cm. in diameter. Sepals of about equal length, yellow striped or spotted reddish brown, the dorsal sepal free, elliptic-lanceolate, shortly acuminate, deeply concave, 3–5 mm. long and 1.5–2 mm. wide, the lateral sepals connate to above the middle, forming a single bifid segment below the lip, 4–6 mm. long and 2.5–3 mm. wide, with 2 distinct keels on the lower surface. Petals subequal to the dorsal sepal and similarly colored, elliptic-oblong, subacute, with distinct central keels on the reverse surfaces, 3–5 mm. long and 2–3 mm. wide. Lip entire, slightly concave, yellow with a red or reddish brown spot at the base, oblanceolate, obtuse or sometimes slightly retuse, the blade with an obscure median constriction, 5–8 mm. long and 2.5–4 mm. wide, the disk with an erect, bicarinate, fleshy callus. Column 1–1.5 mm. long, semiterete, without lateral wings but with 2 short, porrect teeth below the stigma.

Antilles, Panama, and Trinidad.

COCLÉ: El Valle de Antón, 800 m., *Allen 2295*.

A dwarf species, fairly frequent on calabash trees in cultivated plots, the plants being rendered conspicuous by the reddish brown leaves and pseudobulbs. Our specimens are nearly identical with typical West Indian material, but differ considerably from specimens of *Leochilus gracilis* Schltr. from Guatemala, Honduras, and Costa Rica, which would seem to be distinct. In *L. labiatus* the plants are

from 4–9 cm. in height, with elongate scapes up to 25 cm. long, the flowers averaging slightly larger, with the lateral sepals connate to above the middle; while in *L. gracilis* the plants seem to be 2–4.5 cm. tall, the scapes only up to about 6 cm. long, with the lateral sepals entirely free.

2. LEOCHILUS SCRIPTUS (Scheidw.) Rchb. f. Xenia Orch. 1:15, *t. 6.* 1854.

Cryptosanus scriptus Scheidw. in Otto & Dietr. Allg. Gartenzeit. 11:101. 1843.
Oncidium scriptum Rchb. f. in Walp. Ann. 6:772. 1863.
Leochilus major Schltr. in Fedde Rep. Sp. Nov. 15:209. 1918.
Leochilus Powellii Schltr. loc. cit. 17:81. 1922.
Leiochilus retusus Schltr. loc. cit. 19:256. 1923.

Erect, caespitose, epiphytic herbs with approximate, oblong-ovoid to elliptic-oblong, compressed pseudobulbs 2–5 cm. long and 1–2.5 cm. wide, the truncate apices usually monophyllous, the lower portions of the pseudobulbs enveloped in the conduplicate bases of the several distichously imbricating bracts the uppermost 2 or 3 of which are conspicuously foliaceous. Leaves ligular, obtuse or shortly and unequally 2-lobed at the apex, coriaceous, 5.5–14 cm. long and 1–2.8 cm. wide, contracted below into very short, conduplicate petioles. Inflorescences 1 or 2 erect or arching, few- to about 12-flowered racemes or weakly branching panicles, equaling or somewhat exceeding the leaves, up to about 25 cm. in length. Flowers relatively large for the genus, averaging about 1.5–2 cm. in diameter, greenish white to greenish yellow with purple or reddish brown markings. Sepals free, subequal, spreading, the dorsal sepal elliptic-lanceolate, acute, somewhat concave, the reverse surface with a distinct keel, 9–12 mm. long and 3.5–5 mm. wide, the lateral sepals spreading or somewhat reflexed, ligular to oblong-lanceolate, obtuse to subacute, 8–12 mm. long and 2.5–5 mm. wide, the reverse surfaces with a distinct central keel. Petals subequal to the dorsal sepal, lanceolate, acute, 9–12 mm. long and 2.5–3.5 mm. wide. Lip entire, spreading or slightly convex, the blade obovate-oblong, truncate, up to about 12 mm. long and 7 mm. wide, the narrower base conspicuously thickened and adnate to the base of the column, the broader apex shallowly emarginate, the reverse surface with a distinct central keel, the disk with a short, subquadrate, basal boss terminating at the apex in 2 distinct, parallel, erect, fleshy, puberulent calli. Column up to about 3 mm. long, semiterete, the under-surface below the stigma with 2 distinct, ligular, porrect arms.

Guatemala, Honduras, Costa Rica, and Panama.

CANAL ZONE: Las Cascadas, sea level, *Powell 3140, Standley 25755, 29700;* vicinity Gatún, *H. Butcher s. n.* PANAMÁ: Juan Díaz Range, sea level, *Powell 129;* Arraiján, *Powell 3128, 3206;* Río La Maestra, 0–25 m., *Allen 50;* vicinity Chepo, 30 m., *Allen 2355.*

80. SIGMATOSTALIX Rchb. f.

SIGMATOSTALIX Rchb. f. in Bot. Zeit. 10:769. 1852; Benth. & Hook. Gen. Pl. 3:565. 1883; Schltr. in Fedde Rep. Sp. Nov. 15:142. 1918.

Ornithophora Barb. Rodr. Gen. & Spec. Orch. Nov. 2:225. 1882.

Small, caespitose, epiphytic herbs with approximate, elliptic-oblong to ovoid, compressed, monophyllous or rarely diphyllous pseudobulbs, the lower portions partially enveloped in several distichously imbricating bracts the uppermost 2 to 5 of which are usually foliaceous. Leaves linear to elliptic-lanceolate, subcoriaceous to coriaceous. Inflorescences 1 to about 5 erect or arching, few- to many-flowered racemes or panicles about equaling or sometimes much exceeding the leaves in length, produced from the axils of the foliaceous bracts. Flowers small to minute. Sepals subequal, free, or with the laterals shortly connate at the base. Petals subequal to the sepals. Lip usually with an elongate claw, sometimes subsessile, the blade entire or 3-lobed, subquadrate, suborbicular or trulliform. Column slender, elongate, often somewhat arcuate, the apex more or less dilated opposite the stigma. Anther terminal, operculate, incumbent, 1-celled; pollinia 2, waxy.

A small genus of tropical American epiphytes, ranging from Mexico to Brazil. Four species are known to occur in Panama.

a. Lip subsessile, without an elongate claw at the base.
  b. Basal callus of the lip subquadrate, with a deep longitudinal excision on each side of the central concavity ..... 4. S. RACEMIFERA
  bb. Basal callus of the lip transversely subreniform, bifid, with a rounded tubercle in the center of each of the lateral lobules ..... 3. S. HYMENANTHA
aa. Lip with a distinct, elongate claw at the base.
  b. Blade of the lip subquadrate, without distinct auriculate lobules at the base ..... 1. S. ABORTIVA
  bb. Blade of the lip ovate-sagittate to cordate, with 2 distinct auriculate lobules at the base ..... 2. S. GUATEMALENSIS

1. SIGMATOSTALIX ABORTIVA L. Wms. in Ann. Mo. Bot. Gard. 27:284, *t. 34, figs. 1–6.* 1940.

Dwarf, caespitose, epiphytic herbs, with oblong-elliptic, compressed, monophyllous pseudobulbs 12–20 mm. long and 3–11 mm. wide, enveloped below in the conduplicate, distichously imbricating bases of 2 foliaceous bracts. Leaves and bract blades narrowly linear-ligular to elliptic-lanceolate, acute, subcoriaceous, 2–4 cm. long and 0.5–1.0 cm. wide, contracted below into very short, conduplicate petioles. Inflorescences usually solitary, slender, arching, few-flowered racemes up to about 10 cm. long. Flowers minute, averaging about 5 mm. in length. Sepals subequal, free, spreading or reflexed, yellow, lanceolate, acute, about 3.2 mm. long and 0.8–1 mm. wide. Petals somewhat broader than the sepals, yellow, elliptic-lanceolate to oblanceolate, subacute and obscurely apiculate, about 3.2 mm. long and 1.3 mm. wide. Lip with an elongate claw at the base, obovate-spatulate, white, about 5 mm. long and 3.5 mm. wide, the abruptly dilated blade truncate at the apex, subquadrate to suborbicular in outline, the disk with a fleshy, cucullate callus covering the entire upper surface of the claw, the obtuse apex abruptly erect. Column slender, about 3 mm. long, dilated at the apex.

Panama.

COLÓN: Quebrada Lopez, lower slopes of Cerro Santa Rita, 30 m., *Allen 2121.*

Fig. 208. *Sigmatostalix guatemalensis*

2. SIGMATOSTALIX GUATEMALENSIS Schltr. in Fedde Rep. Sp. Nov. 10:253. 1911.

Sigmatostalix costaricensis Rolfe in Kew Bull. 78. 1916; Bot. Mag. *t. 8825.* 1919.
Sigmatostalix poikilostalix Kränzl. in Engler, Pflanzenr. IV, Fam. 50 (Heft 80):310, *fig. 27, D:a-e.* 1922.

Caespitose, epiphytic herbs with approximate, elliptic-oblong, compressed, monophyllous pseudobulbs 1.5–3.5 cm. long and 0.6–1.5 cm. wide, partially enveloped below in the conduplicate bases of several distichously imbricating bracts the uppermost 2 or 3 of which are conspicuously foliaceous. Leaves and bract blades ligular to elliptic-lanceolate, acute, subcoriaceous, 3.5–12 cm. long and 0.8–1.5 cm. wide, contracted below into short, conduplicate petioles. Inflorescences 1 or 2 slender, erect, few- to many-flowered racemes, usually much exceeding the leaves in length, 11–32 cm. long, produced from the axils of the uppermost foliaceous bracts. Flowers relatively large for the genus, averaging about 12–15 mm. in diameter when spread out. Sepals free, subequal, usually strongly reflexed, pale green to yellow, usually marked with brown, ligular-lanceolate, acute, 6–9 mm. long and 1.5–2.5 mm. wide. Petals subequal to the sepals and similarly colored, usually strongly reflexed, rather obliquely lanceolate, acute, 6–9 mm. long and 2–3 mm. wide. Lip with a distinct, narrow, fleshy claw at the base, 2–3 mm. long, produced in front into a short, subacute spur, the blade of the lip abruptly dilated, rather obscurely 3-lobed, spreading or slightly convex, broadly trulliform, ovate-sagittate to cordate, usually reddish brown with a dark yellow apex, rarely entirely yellow, 5–6 mm. long and 4–5 mm. broad, the lateral lobules small, auriculate or with subfalcately acute, incurving projections from the posterior margin, the apex of the blade obtuse to acute, with a short, distinct, central keel on the under-side. Column elongate, slender, somewhat arcuate, up to about 6 mm. long, the lower portion terete, the apex shortly dilated on either side of the stigma, the base without a foot.

Mexico, Guatemala, Costa Rica, and Panama.

CHIRIQUÍ: without definite locality, 5000 ft., *Powell 230.*

3. SIGMATOSTALIX HYMENANTHA Schltr. in Beih. Bot. Centralbl. 36^2:419. 1918.

Small, caespitose, epiphytic herbs with approximate, ovoid to elliptic-oblong, compressed, monophyllous pseudobulbs 1.2–3.5 cm. long and 0.8–2 cm. wide, the lower portions partially enveloped in the conduplicate, distichously imbricating bases of several bracts, the uppermost 2 or 3 of which are conspicuously foliaceous. Leaves and bract blades linear-ligular, acute, subcoriaceous, 3.5–14 cm. long and 0.4–0.8 cm. wide, contracted below into narrow, conduplicate petioles. Inflorescences 1 or 2 slender, erect, shortly branching panicles, usually about equaling the leaves in length, produced from the axils of the uppermost foliaceous bracts, the lateral branches of the panicles usually very short and densely bracteate. Flowers minute. Sepals and petals oblong, acute, about 2 mm. long and 0.5 mm. wide. Lip obscurely 3-lobed, about 1.5 mm. long and 2 mm. wide, subsessile or obscurely

clawed at the base, the blade broadly ovate, obtuse, spreading or slightly convex, the disk with a fleshy, 2-lobed, transversely subreniform callus, with an obscure, rounded tubercle in the center of each of the lateral lobules. Column stout, terete, erect, slightly dilated at the apex, about 1.5 mm. long, the base without a foot.

Costa Rica and Panama.

DARIÉN: vicinity Chepigana, Cana-Cuasi trail, 2000 ft., *Terry & Terry 1437*.

4. SIGMATOSTALIX RACEMIFERA L. Wms. in Ann. Mo. Bot. Gard. 27:285, *t. 36*. 1940.

Small, caespitose, epiphytic herbs 7–15 cm. tall, with elliptic-oblong, compressed, monophyllous pseudobulbs 2–3.5 cm. long and 1–2 cm. wide, the lower portions enveloped in the conduplicate, distichously imbricating bases of several bracts, the uppermost 3 to 5 of which are conspicuously foliaceous. Leaves and bract blades linear-ligular to elliptic-lanceolate, acute, subcoriaceous, 3–13 cm. long and 0.5–1.8 cm. wide, contracted below into short, conduplicate petioles. Inflorescences 1 to 5, slender, erect or arching, few- to many-flowered, shortly branching panicles about equaling or somewhat exceeding the leaves in length, produced from the axils of the foliaceous bracts. Flowers small. Sepals subequal, spreading or reflexed, greenish white, the dorsal sepal free, lanceolate, acute, about 3 mm. long and 0.75 mm. wide, the lateral sepals shortly connate at the base, elliptic-lanceolate, acute to shortly acuminate, about 2.5 mm. long and 0.8 mm. wide. Petals somewhat broader than the sepals, greenish-white spotted maroon, elliptic-lanceolate, acute, about 3 mm. long and 1.25 mm. wide. Lip subsessile or obscurely clawed at the base, the blade subquadrate, truncate, with a distinct median constriction, orange, about 3 mm. long and 3.5 mm. wide, the disk with a fleshy, subquadrate callus, with a deep longitudinal excision on each side of the central linear concavity. Column elongate, slender, about 5 mm. long, terete below, dilated above, with 2 acute auricles on each side of the stigma.

Panama.

COCLÉ: hills north of El Valle de Antón, 800–1000 m., *Allen 1232, 2266, 2744, 2878, 3745*.

81. LOCKHARTIA Hook.

LOCKHARTIA Hook. in Bot. Mag. *t. 2715*. 1827; Benth. & Hook. Gen. Pl. 3:570. 1883; Kränzl. in Engler, Pflanzenr. IV, Fam. 50 (Heft 83):6. 1923.

Fernandezia R. & P., sensu Lindl. Gen. & Sp. Orch. Pl. 207. 1833, in part.

Caespitose, epiphytic herbs without pseudobulbs, the linear, undivided, pseudomonopodial, foliaceous stems erect or pendulous, entirely enveloped in the short, equitant, distichously imbricating, coriaceous leaves. Inflorescences short 1- or 2-flowered scapes or sometimes abbreviated few-flowered panicles, produced from the upper leaf axils. Flowers of moderate size to small, usually yellow, on elongate, filiform pedicels, often subtended by conspicuous membranaceous bracts. Sepals

subequal, free, spreading or with the laterals reflexed. Petals subequal to the sepals or broader. Lip usually complexly 3-lobed, rarely entire, usually conspicuously exceeding the sepals in length, the lateral lobes (if present) often linear, rather long, divaricate or antrorsely incurving, the mid-lobe variously 2- to 4-lobulate, the disk with a papillose, denticulate or tuberculate callus. Column very short, with two broad wings or auricles, the base without a foot. Anther terminal, operculate, incumbent, imperfectly 2-celled; pollinia 2, waxy.

A rather perplexing genus of perhaps 30 species of American epiphytes, ranging from Mexico to Peru and Brazil. Six species, and one variety, are known to occur in Panama.

a. Inflorescences relatively large, spreading, divaricate panicles..... 1. L. ACUTA
aa. Inflorescences very short, compact, subsessile panicles or 1- to 2-flowered scapes.
b. Lip entire or subentire, without distinct linear lobes at the base. Inflorescences 1-flowered.
c. Leaves acute. Apex of the lip deeply emarginate..... 7. L. PITTIERI
cc. Leaves broadly obtuse. Apex of the lip entire..... 5. L. OBTUSATA
bb. Lip with distinct linear lobes at the base. Inflorescences 1-flowered or shortly racemose or paniculate.
c. Flowers very small, the lip usually less than 4 mm. long. Leaves obliquely truncate or obtuse at the apex..... 4. L. MICRANTHA
cc. Flowers relatively large, the lip 7 mm. long or more. Leaves acute or subacute at the apex.
d. Mid-lobe of the lip subpandurate, conspicuously broader at the apex than at the base, with a distinct isthmus or constriction between the apical portion and the smaller lateral lobules..... 6. L. OERSTEDII
dd. Mid-lobe of the lip either subquadrate or conspicuously broader at the base than at the apex.
e. Mid-lobe subquadrate, composed of 4 distinct or obscure, subequal lobules..... 2. L. AMOENA
ee. Mid-lobe quadrate-triangular, more or less distinctly 3-parted..... 3. L. AMOENA var. TRIANGULABIA

1. LOCKHARTIA ACUTA (Lindl.) Rchb. f. in Bot. Zeit. 10:767. 1852.

Fernandezia acuta Lindl. in Bot. Reg. 21: *t. 1806.* 1836.
Lockhartia pallida Rchb. f. in Bonplandia 2:14. 1854.

Caespitose, epiphytic herbs with flattened, pendulous, foliaceous stems, 15–50 cm. long and 1–2 cm. wide. Leaves, as normally seen in profile, rather obliquely triangular, acute or sharply apiculate at the apex, coriaceous, 12–30 mm. long and 4–10 mm. wide. Inflorescences usually 1 to 3 relatively large, spreading, divaricate, few- to many-flowered panicles up to about 8 cm. long, produced from the subterminal leaf axils. Flowers small, white with a yellow lip, less than 10 mm. in diameter when spread out, on slender filiform pedicels subtended by small, subcordate, papery bracts. Sepals free, subequal, spreading, ovate, obtuse, concave, 3–4 mm. long and about 2 mm. wide. Petals elliptic-oblong, obtuse, 4–5 mm. long and about 2 mm. wide. Lip more or less rectangular in outline, about 6 mm. long and 4 mm. wide, the basal half subquadrate, slightly concave, with narrow, erect, lateral margins, the sessile base adnate to the base of the column, the mid-lobe 4-parted, usually somewhat reflexed, the lateral lobules acute, spreading or

Fig. 209. *Lockhartia acuta*

divaricately extrorse, the projecting central lobule oblong to subquadrate, the apex deeply emarginate, the disk with a bifid, puberulent callus, the concave base under the column with a minute, semiglobose, densely papillose, shortly stipitate process. Column very short, 1–1.5 mm. long, with broadly spreading triangular or auriculate wings on each side of the stigma, the base without a foot.

Panama, Colombia, Venezuela, and Trinidad.

CANAL ZONE: Pedro Miguel, sea level, *Powell 3051;* upper Chagres River, Madden Lake region, 70–75 m., *Steyermark 17515.* PANAMÁ: hills near Panama City, sea level, *Powell 52;* forests of Juan Díaz, near Panama City, 20–50 m., *Pittier 2551;* Chiva-Chiva, sea level, *Powell 3014, 3019;* San José Island, Perlas Archipelago, *Johnston 1217.* COLÓN: Río Gatuncillo, vicinity Santa Rosa, 25 m., *Allen 4253.*

A common lowland species with very small flowers, readily recognizable by the relatively long, pendulous, foliaceous stems and the conspicuous, broadly paniculate inflorescences.

2. LOCKHARTIA AMOENA Endres & Rchb. f. in Gard. Chron. 666. 1872.

Lockhartia costaricensis Schltr. in Fedde Rep. Sp. Nov. 3:81. 1906.
Lockhartia-grandibracteata Kränzl. in Engler, Pflanzenr. IV, Fam. 50 (Heft 83):15. 1923.

Caespitose, epiphytic herbs with erect or pendulous, flattened, foliaceous stems 12–40 cm. long and 1.4–2.5 cm. wide. Leaves narrowly triangular in profile, subacute, coriaceous, 1.5–3.5 cm. long and 0.4–1.0 cm. wide. Inflorescences short, compact, few-flowered panicles, up to about 3 cm. long. Flowers relatively large for the genus, on long filiform pedicels subtended by conspicuous, ovate-cordate, membranaceous bracts. Sepals free, subequal, slightly concave, yellow, the dorsal sepal erect or somewhat reflexed, ovate, obtuse, with a minute, terminal apicule, 5–6 mm. long and about 4 mm. wide, the lateral sepals strongly reflexed in natural position, elliptic-lanceolate, subacute, 5–6 mm. long and about 4 mm. wide. Petals somewhat longer than the sepals, yellow, elliptic-oblong, obtuse, incurving, the lateral margins conduplicately reflexed in natural position, 5–7 mm. long and about 4 mm. wide when spread out. Lip complexly 3-lobed, yellow, with reddish brown markings at the base, about 10 mm. long and 8 mm. wide, the lateral lobes linear-ligular, acute, antrorsely incurving in natural position, the mid-lobe subquadrate, distinctly or obscurely 4-lobulate, with undulate margins, the truncate apex with a deep central sinus, the basal lobules equaling or somewhat exceeding the 2-parted mid-lobule in width when spread out, very strongly reflexed in natural position, the disk with a linear, truncate, papillose callus. Column very short, with broadly spreading, lateral wings.

Costa Rica and Panama.

COCLÉ: hills north of El Valle de Antón, 1000 m., *Allen 2313;* mountains beyond La Pintada, 400–600 m., *Hunter & Allen 586.* CHIRIQUÍ: Palo Alto Hill, 4000–5000 ft., *Powell 362;* vicinity Casita Alta, Finca Lérida, eastern slopes of Chiriquí Volcano, 1500–2000 m., *Woodson, Allen & Seibert 966.*

A variable and rather perplexing highland species with relatively large, attractive flowers. It is probably allied to *L. Oerstedii*, but differs in the mid-lobe of the lip, which is more or less subquadrate and 4-lobulate, the basal half equaling or exceeding the apical half in width.

3. Lockhartia amoena Endres & Rchb. f. var. triangulabia C. Schweinf. & P. H. Allen in Bot. Mus. Leafl. Harv. Univ. 13:150. 1948.

Lockhartia triangulabia A. & S. in Sched. Orch. 8:80. 1925.

Vegetative parts and inflorescences apparently as in the type. Sepals subequal, free, probably more or less reflexed in natural position, about 5.4 mm. long and 3 mm. wide, the dorsal sepal ovate, subacute, the lateral sepals rather obliquely elliptic-oblong, obtuse, all three sepals dorsally mucronate at the apex. Petals oblong, obtuse, about 5.4 mm. long and 3 mm. wide. Lip broadly quadrate-triangular in outline, complexly 5-lobulate, about 7.2 mm. long and 10 mm. wide at the base, the lateral lobes rather obliquely ligular, obtuse, the mid-lobe more or less 3-parted, the basal lobules triangular, the basal half of the mid-lobe about twice as wide as the subquadrate, emarginate apical half, the disk with a linear-oblong, minutely papillose callus, the base under the column thickened into a semiorbicular minutely papillose boss.

Panama.

Chiriquí: without definite locality, 4000–5000 ft., *Powell 362-A*.

Lockhartia amoena, as represented by the quite numerous specimens available for study, exhibits a distinct tendency to vary from a condition in which the basal and apical halves of the 4-parted mid-lobe are of subequal width, to one in which the bifid, apical segment is considerably narrower. Our present single specimen apparently represents an extreme example of this tendency and seems sufficiently distinctive to warrant varietal rank.

4. Lockhartia micrantha Rchb. f. in Bot. Zeit. 10:768. 1852.

Lockhartia chiriquiensis Schltr. in Fedde Rep. Sp. Nov. 12:215. 1913.
Lockhartia Lankesteri Ames, in Sched. Orch. 5:36. 1923.

Caespitose, epiphytic herbs with erect or pendulous, flattened, foliaceous stems typical of the genus, 5–40 cm. long and 1–2 cm. wide. Leaves equitant, coriaceous, in profile narrowly triangular with obliquely truncate or obtuse apices, 0.8–2 cm. long and 0.35–1.0 cm. wide. Inflorescences simple 1- to 3-flowered scapes or abbreviated, few-flowered panicles up to about 2 cm. long, produced from the central or subterminal leaf axils. Flowers small, yellow, on slender, filiform pedicels subtended by ovate-cordate, membranaceous bracts. Sepals subequal, free, spreading, concave, ovate to elliptic-oblong, acute and apiculate, 2.5–4 mm. long and 2–3 mm. wide. Petals broadly ovate to elliptic-ovate, obtuse, 2.5–4 mm. long and 1.5–2 mm. wide. Lip complexly 3-lobed, 2.5–5 mm. long and 2.5–5 mm. wide, the lateral lobes linear-ligular, obtuse, spreading or reflexed, the mid-lobe

Fig. 210. *Lockhartia obtusata*

rhombic-obovate to obovate, the lateral margins obscurely lobulate, the apex deeply retuse, the disk with a low, slightly concave, more or less bifid callus. Column very short, with spreading lateral wings, the base without a foot.

Nicaragua to Surinam (fide Kränzlin).

CANAL ZONE: Balboa, on mango tree, *Standley 25494;* Río Pedro Miguel, near East Paraiso, *Standley 29984;* Las Cruces, *Powell 3189;* Miraflores, *Powell 3203;* Pedro Miguel, *Powell 3049;* drowned forests of the Quebrada Tranquilla, Madden Lake region, *Dodge & Allen 17325;* Río Indio, Madden Lake region, *Steyermark & Allen 17437, 17440.* PANAMÁ: Río La Maestra, coastal area east of the Río Bayano, 0–25 m., *Allen 61.* COCLÉ: hills north of El Valle de Antón, 1000–1200 m., *Allen 2318, 2903, 3420, 3939, 4259.* VERAGUAS: vicinity Santa Fé, 1000 ft., *Allen 4429;* vicinity Bahía Honda, *Taylor 1510.* CHIRIQUÍ: vicinity San Felix, 0–120 m., *Pittier 5286;* without definite locality, 4000 ft., *Powell 3476.*

A common small-flowered species somewhat reminiscent of *Lockhartia acuta,* but distinguished by the usually shorter foliaceous stems, much shorter inflorescences, yellow flowers, and differently shaped lip.

5. LOCKHARTIA OBTUSATA L. Wms. in Amer. Orch. Soc. Bull. 9:209, *t. 8.* 1941.

Caespitose, epiphytic herbs with broad, strongly flattened, foliaceous stems up to about 35 cm. tall and 2.5–3.5 cm. wide. Leaves equitant, distichously imbricating, coriaceous, obliquely oblong as seen in profile, obtuse, 2–4 cm. long and 0.5–1.0 cm. wide. Inflorescences short, condensed racemes from the upper leaf axils. Flowers relatively large and attractive, bright yellow with a conspicuous orange callus at the base, apparently produced singly in succession from the terminal cluster of ovate, acute, papery bracts. Sepals subequal, free, spreading, ovate, obtuse to shortly acute, minutely apiculate, about 9 mm. long and 6 mm. wide. Petals elliptic-oblong, obtuse, 9–10 mm. long and 5–6 mm. wide. Lip entire, suborbicular, slightly convex, 9–10 mm. long and 9–10 mm. wide, the anterior margin sometimes slightly retuse, the disk with an elliptic-oblong to obovate, obtuse callus, about 5 mm. long and 3–4 mm. wide, the apex conspicuously thickened and papillose, with a short, erect, acute, central spur. Column about 2 mm. long, with conspicuous lateral wings, the base without a foot.

Panama.

COCLÉ: hills north of El Valle de Antón, 1000 m., *Allen 2160, 3550.*

A strikingly handsome highland species apparently allied to *L. Pittieri,* but distinguished by the broad, obtuse leaves, the larger flowers, and the unique, entire, suborbicular lip.

6. LOCKHARTIA OERSTEDII Rchb. f. Xenia Orch. 1:100, 105, *t. 40.* 1855.

Lockhartia verrucosa Rchb. f. in Hamb. Gartenzeit. 15:53. 1859.
Lockhartia lamellosa Rchb. f. loc. cit. 16:300. 1860.
Fernandezia robusta Batem. in Bot. Mag. *t. 5592.* 1866.
Lockhartia robusta (Batem.) Schltr. in Fedde Rep. Sp. Nov. 3:82. 1906.

Caespitose, epiphytic herbs with strongly flattened, foliaceous stems 7–40 cm. long and 0.8–1.5 cm. wide. Leaves narrowly triangular as seen in profile, acute, 1–3 cm. long and 0.4–0.8 cm. wide. Inflorescences very short, 1- to 3-flowered racemes produced from the axils of the upper leaves. Flowers very variable in size, but often relatively large and attractive, the pedicels subtended by papery, ovate-cordate bracts. Sepals usually strongly reflexed, sometimes slightly concave, yellow, the laterals sometimes spotted with red, elliptic-oblong to ovate, obtuse to shortly acute, 4–8 mm. long and 3–5 mm. wide. Petals yellow, sometimes spotted red, oblong-ovate to broadly and obliquely ligular, obtuse or slightly retuse at the apex, antrorsely incurving in natural position, the lateral margins usually more or less undulate and strongly reflexed, 4–8 mm. long and 3–6 mm. wide. Lip complexly 3-lobed, 7–12 mm. long and 6–14 mm. wide, yellow with red or reddish brown markings at the base, the lateral lobes linear-ligular, obtuse or obliquely acute, spreading or antrorsely incurving in natural position, the mid-lobe more or less pandurate, 4-lobulate, the basal half distinctly narrower than the apical half, the small basal lobules rounded or obliquely triangular, strongly reflexed in natural position, sometimes confluent with the bases of the linear lateral lobes, the center of the mid-lobe with a distinct constriction which is often prolonged into a short isthmus, the apical lobule usually abruptly dilated, 2-parted with a deep central sinus, the disk with a narrowly flabellate or sometimes linear, strongly verrucose callus, extending to the median constriction. Column with spreading, minutely denticulate or crenulate lateral wings.

Mexico, Guatemala, Honduras, Costa Rica, and Panama.

CHIRIQUÍ: Llano del Volcán, southwestern slopes of Chiriqui Volcano, 1500 m., *Allen & Fairchild 3502;* vicinity Cerro Punta, headwaters of the Río Chiriquí Viejo, 2000 m., *Allen & Fairchild 3493;* valley of the upper Río Chiriquí Viejo, vicinity Monte Lirio, 1300–1900 m., *Seibert 132, 133, 186;* without definite locality, 4000–4500 ft., *Powell 3344, 3352;* vicinity Bajo Mono, headwaters of the Río Caldera, 4500 ft., *Davidson 584;* vicinity Finca Lérida, eastern slopes of Chiriquí Volcano, 1750 m., *Woodson & Schery 236;* forested slopes along Quebrada Velo, 5000 ft., *Allen 4743;* bamboo-oak forest, south of Finca Lérida, eastern slopes of Chiriquí Volcano, 6000–7000 ft., *Allen 4764;* forested hills east of Boquete, 4500–6500 ft., *Allen 4666.*

A common, attractive highland species apparently closely allied to the South American *L. lunifera* (Lindl.) Rchb. f. In Panama, the species is readily separable from its nearest ally, *L. amoena,* by the subpandurate mid-lobe of the lip, which is always broadest at the apex.

7. LOCKHARTIA PITTIERI Schltr. in Fedde Rep. Sp. Nov. 12:216. 1913.

Lockhartia variabilis A. & S. in Sched. Orch. 8:81. 1925.

Caespitose, epiphytic herbs with distichous, foliaceous stems up to about 20 cm. tall and 2.5–4.5 cm. wide. Leaves linear-lanceolate to narrowly triangular as seen in profile, obliquely acute to acuminate, 2–3.5 cm. long and 0.4–0.9 cm. wide. Inflorescences very short, apparently solitary, 1-flowered scapes produced from the axils of the upper leaves. Flowers of moderate size for the genus, yellow

with an orange callus at the base. Sepals elliptic-lanceolate, acute, with apiculate tips, 3.9–4.9 mm. long and about 2 mm. wide. Petals somewhat broader than the sepals, elliptic-oblong to suborbicular, obtuse to acute, 4–5 mm. long and 2.4–3.2 mm. wide. Lip oblong-quadrate, 7–8 mm. long and 5–6.4 mm. wide, slightly convex, the apex deeply emarginate, the lateral margins sometimes obscurely lobular, the disk with an elliptic-oblong to ovate-oblong callus, the margins elevated, the apex conspicuously thickened and minutely papillose, with an erect, subacute, central spur, the inner elliptic depression with a low, rounded boss.

British Honduras, Costa Rica, and Panama.

CANAL ZONE: vicinity Bohío, *Pittier 3401;* Fort Sherman and mouth of the Chagres River, *Powell 372;* wooded hills near Frijoles, sea level, *Powell 355;* Cativo-Porto Bello trail, *Powell 361.* DARIÉN: vicinity Marragantí, 10–200 ft., *R. S. Williams 1008.*

DOUBTFUL SPECIES

LOCKHARTIA MIRABILIS Rchb. f. Xenia Orch. 1:100, 106, *t. 40, figs. 11–12.* 1855.

Apparently described from flowering material only, without vegetative parts. The figures in the 'Xenia Orchidaceae' might be poor drawings of what we know as *Lockhartia Oerstedii,* seen in natural position, with the lateral lobules of the mid-lobe reflexed. Since both of these concepts seem very close to that of the South American *L. lunifera* Rchb. f., and since *L. mirabilis* is absent from all recent collections in Panama, it would seem best to exclude it, pending the rather remote possibility of direct examination of type material of both this and *L. lunifera.*

LOCKHARTIA ELEGANS Hook. in Bot. Mag. *t. 2715.* 1827.

A South American species, apparently having the northern limit of its range in Trinidad. Listed by Schlechter from Panama, but absent from all collections.

LOCKHARTIA OBTUSIFOLIA Regel in Ann. Sci. Nat. VI, 2:378. 1856.

A Colombian species, doubtfully listed by Kränzlin from Panama. Absent from all collections.

82. ORNITHOCEPHALUS Hook.

ORNITHOCEPHALUS Hook. Exot. Fl. 2: *t. 127.* 1825; Benth. & Hook. Gen. Pl. 3:568. 1883.

Small, epiphytic herbs without pseudobulbs, the equitant, fleshy or coriaceous leaves distichously imbricating and forming a broad or narrow fan, the blades articulated below, those at the base of the fan caducous, the persistent sheathing bases sometimes thickened and resembling pseudobulbs. Inflorescences 1 to several slender, erect or pendulous racemes produced from the leaf axils. Sepals subequal, free, spreading, often concave. Petals subequal to the sepals or larger and flabellate. Lip entire or 3-lobed, the subsessile base continuous with the base of the column, the lateral lobes (if present) membranaceous or sometimes thickened, the mid-lobe short or more frequently elongate, often inflexed, the disk with a fleshy, bifid, bialate or bicornute callus. Column short, rather stout, without wings or ap-

pendages, the rostellar process very long and attenuate, the base of the column without a foot. Anther terminal, operculate, incumbent, imperfectly 2-celled, produced above the cells into an attenuate appendage resting on the rostellar process, sometimes exceeding it in length, the column and anther resembling the head and beak of a bird (genus unknown!); pollinia 4, waxy.

A small genus of dwarf, pseudobulbless, epiphytic herbs, ranging from Mexico to Brazil. Four species are known from Panama.

a. Rachis of the inflorescence densely glandular-hispid.
  b. Lip linear-navicular, incurving, the fleshy basal plate with 2 divergent horns..... 1. O. BICORNIS
  bb. Lip subquadrate-cochleate, without 2 divergent horns at the base..... 2. O. COCHLEARIFORMIS
aa. Rachis of the inflorescence glabrous or minutely puberulent.
  b. Flowers relatively large. Lip panduriform, broadest at the base, with a distinct fleshy, 2-parted callus..... 4. O. POWELLII
  bb. Flowers small. Lip linear-navicular, incurving, the lateral lobes thickened and erect..... 3. O. INFLEXUS

1. ORNITHOCEPHALUS BICORNIS Lindl. in Bot. Voy. Sulphur, 172. 1843.

Ornithocephalus xiphochilus Schltr. in Fedde Rep. Sp. Nov. 3:251. 1906.
Zygostates costaricensis Nash, in Bull. Torr. Bot. Club 34:122, *t. 8.* 1907.
Ornithocephalus lanuginosus Ames, in Proc. Biol. Soc. Wash. 34:152. 1921.
Ornithocephalus diceras Schltr. in Fedde Rep. Sp. Nov. Beih. 17:87. 1922.

Small, epiphytic herbs 3.5–12 cm. tall, the equitant leaves distichously arranged in the form of a broad fan. Leaf blades articulated to the conduplicate, imbricating, persistent bases, coriaceous, lanceolate to gladiate as seen in profile, obliquely acute, 2–9 cm. long and 0.4–1.2 cm. wide. Inflorescences 1–10 slender, many-flowered, axillary racemes about equaling the leaves in length, the rachis densely hispid with spreading glandular hairs. Flowers small, greenish or yellowish, on short hispid pedicels subtended by ovate, acute, membranaceous, ciliate bracts. Sepals suborbicular, concave, about 2 mm. in diameter, the reverse surfaces somewhat hispid, with a central elevated keel, terminating in a short mucro. Petals subequal to the sepals, very shortly clawed at the base, the blades orbicular, concave, about 2 mm. in diameter, the reverse surfaces more or less hispid, with a ciliate central keel, terminating in a short mucro. Lip entire, linear-navicular, acute, strongly incurving, about 4–5 mm. long when spread out, the base with a fleshy, papillose, subquadrate to suborbicular, cushion-like callus, produced at the sides into 2 short, divergent, horn-like appendages each about 1 mm. in length.

Guatemala, Honduras, Costa Rica, and Panama.

CANAL ZONE: drowned forest of the Quebrada Ancha, upper Madden Lake region, 70 m., *Steyermark & Allen s. n.*; vicinity Salamanca Hydrographic Station, Gorge of the Río Pequení, Madden Lake area, 70–80 m., *Dodge, Steyermark & Allen 16069.* PANAMÁ: hills east of Panama City, sea level, *Powell 174*; edge of forest along Panama-Pacora road, near Río Tecúmen, *Killip 3314*; without definite locality, *Sinclair s. n.* VERAGUAS: without definite locality, *Hinds s. n.*

Fig. 211. *Ornithocephalus bicornis*

A common, small-flowered lowland species distinguished from O. *cochleariformis* by the elongate, narrowly navicular, incurving lip and from O. *inflexus* by the densely hispid rachis and the divergent horns of the basal callus.

2. ORNITHOCEPHALUS COCHLEARIFORMIS C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 4:124. 1937.

Epiphytic herbs 3.5–12 cm. tall. Leaves as seen in profile narrowly elliptic-oblong to broadly ensiform, acute or obliquely acute, 3–7.5 cm. long and 0.7–1.5 cm. wide, the blades articulated to the oblong, persistent, conduplicate bases. Inflorescences 1–8 slender, arching or pendulous racemes up to about 9 cm. long, the rachis densely glandular-hirsute. Flowers of moderate size for the genus, on slender hirsute pedicels subtended by broadly ovate to suborbicular bracts with glandular-ciliate keels and margins. Sepals suborbicular to obovate, concave,

white, about 3 mm. in diameter, the reverse surfaces and margins densely glandular-hirsute, the lateral sepals slightly oblique, with lacerate keels on the outer surfaces. Petals subequal to sepals, white, broadly obovate, concave, the outer surfaces ciliate, with a conspicuously lacerate central keel. Lip deep green, entire, broadly calceiform, deeply concave, about 4.2 mm. long and 3.2 mm. wide, the truncate or subcordate base adnate to the base of the column, the shortly acute apex strongly inflexed, the disk transversely thickened, minutely papillose, the lateral margins decurrent, with 2 short, lateral, acute swellings, finally truncately converging below at the base of the inner concavity of the lip.

Panama.

COCLÉ: lower valley and marshes along the Río Antón, 600 m., *Hunter & Allen 383*, *Allen 3920*, *4233*; rim of El Valle de Antón, 2500 ft., *Purdom s. n.*; hills north of El Valle de Antón, 1000 m., *Allen 2292*.

A common highland species of the region of El Valle de Antón, in Coclé Province. It is distinguished by the densely glandular-hirsute outer surfaces of the sepals and petals, and by the broadly calceiform lip.

3. ORNITHOCEPHALUS INFLEXUS Lindl. in Ann. Nat. Hist. I, 4:384. 1840.

Ornithocephalus mexicanus A. Rich. & Gal. in Ann. Sci. Nat. III, 3:24. 1845.
Ornithocephalus elephas Rchb. f. in Walp. Ann. 6:493. 1863.
Ornithocephalus Pottsiae S. Wats. in T. Brigh. Guatem. Append. 429. 1887.
Ornithocephalus Tonduzii Schltr. in Beih. Bot. Centralbl. 36^2:420. 1918.

Dwarf, epiphytic herbs, the equitant, imbricating leaves forming a fan as in the genus. Leaves linear-lanceolate to ensiform as seen in profile, acute to acuminate, coriaceous, 4.5–8 cm. long and 0.25–0.5 cm. wide, the blades articulated to the persistent, conduplicate bases. Inflorescences 1 to several slender racemes up to about 8 cm. long, produced from the axils of the leaves, the rachis glabrous or minutely puberulent. Flowers small, on slender pedicels subtended by oblong-lanceolate, acute, minutely ciliate bracts. Sepals suborbicular, concave, about 2 mm. in diameter, the reverse surfaces essentially glabrous, with distinct central keels, terminating in a short mucro. Petals broadly flabellate-cuneate to dolabriform, about 2 mm. long and 3 mm. wide. Lip entire, linear-ligular, acute to acuminate, navicular, usually inflexed, about 5 mm. long and 2 mm. wide, the base thickened into a short bialate or biauriculate callus, the fleshy rounded or subquadrate wings usually erect or with the upper margins converging.

Mexico, British Honduras, Guatemala, Honduras, Costa Rica, and Panama.

CHIRIQUÍ: without definite locality, 4000 ft., *Powell 431*.

4. ORNITHOCEPHALUS POWELLII Schltr. in Fedde Rep. Sp. Nov. Beih. 17:88. 1922.

Epiphytic herbs 5–8 cm. tall, the equitant leaves distichously arranged in the form of a broad fan, as in the genus. Leaves subfalcately ligular as seen in profile, obliquely acute, often shortly apiculate, coriaceous, 3.5–6.5 cm. long and 0.6–1.2

cm. wide, the blades articulated with the very short, conduplicate, persistent bases. Inflorescences 1 or 2 slender racemes up to about 9 cm. long, produced from the leaf axils, the rachis laterally compressed, narrowly winged, subglabrous to puberulent. Flowers rather large for the genus, deep green with a white basal callus, the short, angulate pedicels subtended by elliptic-ovate, acute bracts which have a strongly developed keel and minutely ciliate margins, the apices of the bracts shortly mucronate. Sepals spreading or reflexed, ovate to oblong-ovate, concave, about 4 mm. long and 2.5–3 mm. wide, the outer surfaces with a distinct central keel, terminating in a short mucro, the margins of the sepals ciliate or serrulate. Petals much broader than the sepals, obovate-cuneate to obovate-flabellate, about 6 mm. long and 8 mm. wide, the upper rounded margins minutely ciliate to serrulate. Lip panduriform, obscurely 3-lobed, about 1 cm. long and 0.5 cm. wide at the base, the broadly ovate to subcordate basal half adnate to the base of the column, the anterior margins converging in an elongate isthmus, the subflabellate apex rather abruptly dilated and truncate, with serrulate margins, the apical half of the lip usually porrect in natural position, the disk with a prominent fleshy, porrect, divergently 2-lobulate callus.

Panama.

PANAMÁ: foothills east of Panama City, sea level, *Powell 231;* San Juan de Pequení [now under water in the Madden Lake area], *Powell 3279.*

The largest-flowered species of the genus in our area. The pair of low, divergent, linear calli described by Schlechter is an optical illusion produced in translucent liquid material by the shadows of the margins of the lateral sepals which rest against the back of the lip.

82-A. OAKES-AMESIA C. Schweinf. & P. H. Allen

OAKES-AMESIA C. Schweinf. & P. H. Allen in Bot. Mus. Leafl. Harv. Univ. 13:133, *t. 10.* 1948.

Dwarf, epiphytic herbs without pseudobulbs, the equitant, coriaceous leaves distichously imbricating and forming a broadly radiate cluster. Leaf blades ensiform as seen in profile, obliquely acute, articulated to the conduplicate bases. Inflorescences erect or arching racemes produced from the subterminal leaf axils. Flowers small, the short pedicels subtended by elliptic-ovate, acuminate bracts. Sepals free, subequal, spreading, or the laterals reflexed, elliptic-oblong, subacute, the reverse surfaces with a distinct central keel. Petals much larger than the sepals, spreading, broadly obovate-flabellate. Lip somewhat fleshy, sharply 3-lobed, exceeding the lateral sepals in length, the base sessile and continuous with the base of the column, the lateral lobes very prominently developed, erect in natural position, the mid-lobe more or less subquadrate when seen from above, somewhat dilated and obscurely biauriculate at the abruptly truncate apex, the small lateral auricles obliquely acute, the under-surface of the mid-lobe produced into a very prominent, obliquely triangular, obtuse to subacute, laterally compressed keel

which is apparently hollow with a narrow transverse opening at the apex of the lip, the disk with a low, linear-ligular, truncate, densely papillose callus. Column very slender and subterete below, somewhat dilated above, wingless and footless, a little below the lightly arcuate apex with a very large, distinctly 3-lobulate rostellar process. Anther suborbicular, terminal, operculate, incumbent, imperfectly 2-celled; pollinia 4, apparently cartilaginous.

A genus of dwarf highland epiphytes thus far known only from Panama. The plants strongly resemble those of the allied genus *Ornithocephalus*, but the flowers are amply separated by the very large, 3-lobulate rostellar process, the relatively very short terminal appendage of the anther, the short, abruptly truncate, sharply 3-lobed lip, the prominent, apparently hollow keel of the lip, the linear-ligular callus, and other characters.

1. Oakes-Amesia cryptantha C. Schweinf. & P. H. Allen in Bot. Mus. Leafl. Harv. Univ. 13:134, *t. 10.* 1948.

Dwarf, epiphytic herbs, the leaves forming a broadly radiate cluster 4 cm. tall and 7.5 cm. wide. Leaf blades ensiform as seen in profile, obliquely acute, 1.8–3.9 cm. long and 0.3–0.5 cm. wide, articulated to the conduplicate bases, the plants identical in vegetative appearance with those of *Ornithocephalus inflexus*. Inflorescences 1 to 3 erect or arching racemes about 5.5 cm. long, produced from the subterminal leaf axils, the rachis slightly fractiflex and rather complanate, narrowly triangular in cross-section. Flowers small, the sepals and petals white, the lip dark green marked with white, the short pedicels subtended by long, elliptic-ovate, acuminate bracts which have strongly developed keels on the lower surfaces, the bracts conspicuously exceeding the floral pedicels in length. Sepals free, subequal, elliptic-oblong, subacute, slightly concave, unevenly serrulate, irregularly glandular-verrucose on both surfaces, the reverse surfaces with a distinct central keel, terminating in an elongate spinous process, the dorsal sepal spreading or slightly reflexed, about 2.7 mm. long and 1.25 mm. wide, the lateral sepals strongly reflexed, about 2.9 mm. long and 1.5 mm. wide. Petals much larger than the sepals, spreading, broadly obovate-flabellate, the abruptly truncate blades with shallow transverse concavities below the irregularly serrulate upper margins, the blades about 3 mm. long and 3 mm. wide at the apex, both the frontal and reverse surfaces irregularly glandular-verrucose. Lip rather fleshy, sharply 3-lobed, the sessile base continuous with the base of the column, the very prominent lateral lobes rather obliquely oblong, truncate, erect in natural position and somewhat antrorse, about 1.5 mm. long and 1 mm. wide, minutely ciliate, the mid-lobe subquadrate when seen from above, somewhat dilated and obscurely biauriculate at the abruptly truncate apex, the small lateral auricles obliquely acute, the undersurface of the mid-lobe produced into a very prominent, obliquely triangular, obtuse to subacute, laterally compressed keel which is apparently hollow with a narrow, transverse opening at the apex of the lip, the entire lip sparsely and irregularly glandular-verrucose, about 4 mm. long and 2.5 mm. wide at the apex,

the disk with a low, linear-ligular, abruptly truncate, densely papillose callus. Column very slender below, wingless, footless, below the slightly arcuate apex extends a very large, 3-lobulate rostellar process which considerably exceeds the rest of the column in length and bulk, 3 mm. long and 1 mm. wide, the lateral lobules semiorbicular, abruptly deflexed in natural position, the porrect, slightly undulate apical lobule more or less terete, all 3 lobules of the rostellar process rather densely glandular-verrucose. Column above the rostellar process short, slightly arcuate, the anther suborbicular, terminal, operculate, incumbent, imperfectly 2-celled, with a slender, ligular, acuminate appendage, the rostellar process and anther rather resembling the head and folded legs of a praying mantis when seen in profile.

Panama.

COCLÉ: Cerro Pajita, hills north of El Valle de Antón, 1000–1200 m., *Allen & Allen 4196*.

83. NOTYLIA Lindl.

NOTYLIA Lindl. in Bot. Reg. 11: sub *t. 930.* 1825; Rchb. f. Xenia Orch. 1:49. 1854; Benth. & Hook. Gen. Pl. 3:586. 1883.

Tridachne Liebm. ex Lindl. in Paxt. Flow. Gard. 3:45. 1852-53, nom nud.
Macroclinium Barb. Rodr. Gen. & Spec. Orch. Nov. 2:236. 1882.

Small, epiphytic herbs with or without pseudobulbs. Leaves usually flat, rarely equitant, coriaceous or fleshy. Inflorescences arching or pendulous, few- to many-flowered racemes, or rarely panicles, produced from the bases of the pseudobulbs or axils of the leaves. Flowers usually small, rarely of moderate size, on slender pedicels, the subtending bracts usually narrow. Sepals subequal, usually narrow, erect or spreading, free or with the laterals more or less connate. Petals subequal to the sepals or smaller. Lip entire or obscurely lobed, usually clawed at the base, rarely sessile, continuous with the base of the column, the lamina triangular or hastate, acuminate, the disk smooth or with a carinate callus. Column erect, terete or sulcate, glabrous, papillose or velutinous, without wings or appendages, the apex usually slightly recurved, the rostellum more or less elongate, acuminate, erect, the base of the column without a foot. Anther erect, oblong, imperfectly 2-celled, above the cells more or less long-appendaged and applied to the rostellum; pollinia 2, waxy.

Small tropical American herbs ranging from Mexico to Brazil. They have been divided by Cogniaux into two well-marked subgenera, in the first of which, EUNOTYLIA, the plants have small but distinct, monophyllous pseudobulbs, with flat leaves; while in the second, MACROCLINIUM, the leaves are equitant and distichously imbricating, the conduplicate bases sometimes enveloping a small complanate pseudobulb. Five species, representing both subgenera, are known from Panama.

a. Leaves equitant, ensiform. Lip cordate-hastate, distinctly 3-lobed. (Subgenus MACROCLINIUM) ..... 2. N. CORDESII
aa. Leaves flat, ligular to oblong-lanceolate. Lip trulliform. (Subgenus EUNOTYLIA).
  b. Column distinctly papillose..... 5. N. PENTACHNE
  bb. Column glabrous.
    c. Lip about 5 mm. wide at the base..... 3. N. LATILABIA
    cc. Lip less than 3 mm. wide at the base.
      d. Dorsal sepal broadly elliptic-oblanceolate, obtuse, about 5 mm. wide, distinctly broader than the lip..... 4. N. PANAMENSIS
      dd. Dorsal sepal linear-lanceolate, subacute, 2 mm. wide or less, distinctly narrower than the lip..... 1. N. BARKERI

1. NOTYLIA BARKERI Lindl. in Bot. Reg. n. s. 1: Misc. 90. 1838.

Notylia multiflora Hook. in Lond. Jour. Bot. 3:315, *t. 10.* 1844, non Lindl.
Notylia Huegelii Fenzl. in Denkschr. Akad. Wien, Math. Nat. Kl. 2:255. 1850.
Notylia trisepala Lindl. & Paxt., in Paxton's Flow. Gard. 3:45. 1852-53; Bot. Mag. *t. 8306.* 1910.
Tridachne virens Liebm. ex Lindl. & Paxt. loc. cit. 1852-53.
Notylia Tridachne Lindl. & Paxt. loc. cit. 1852-53.
Notylia bipartita Rchb. f. Xenia Orch. 1:47. 1854.
Notylia tamaulipensis Rchb. f. in Hamb. Gartenzeit. 16:281. 1860.
Notylia guatemalensis S. Wats. in Proc. Amer. Acad. 22:477. 1887, non Schltr.
Notylia angustilancea Schltr. in Orchis 8:135, *t. 4, figs. 8–13.* 1914.
Notylia guatemalensis Schltr. in Fedde Rep. Sp. Nov. 15:208. 1918, non S. Wats.
Notylia Bernoullii Schltr. in Beih. Bot. Centralbl. 36^2:502. 1918, nomen.
Notylia Pittieri Schltr. loc. cit. 418. 1918.
Notylia turialbae Schltr. in Fedde Rep. Sp. Nov. Beih. 19:145. 1923.
Notylia Brenesii Schltr. loc. cit. 249. 1923.

Small, epiphytic herbs with oblong, compressed, monophyllous pseudobulbs up to about 2.5 cm. long and 1.0 cm. wide, the bases enveloped in several imbricating bracts, the uppermost 1 or 2 of which are conspicuously foliaceous. Leaves and bract blades ligular, obtuse to subacute, coriaceous, up to about 18 cm. long and 0.8–4 cm. wide. Inflorescences 1 or 2 arching or pendulous, densely flowered racemes up to about 30 cm. long but often considerably less, produced from the bases of the pseudobulbs. Flowers small, white, sometimes spotted yellow, on filiform pedicels, subtended by narrow, acuminate bracts. Sepals subequal, more or less spreading, the dorsal sepal free, linear-lanceolate, subacute, concave, somewhat inflexed, 3–6 mm. long and 1–2 mm. wide, the lateral sepals usually more or less connate, rarely free, forming a single bifid segment under the lip, 3–5 mm. long and 1–2 mm. wide, rather obliquely subacute. Petals subfalcately linear-lanceolate, acute, 2.5–5 mm. long and 1–1.5 mm. wide. Lip clawed at the base and continuous with the base of the column, the lamina narrowly triangular, acuminate, 3–5 mm. long and 1–2 mm. wide at the base, the disk usually with a distinct carinate callus. Column slender, erect, terete, 2–3 mm. long, the base without a foot.

Mexico to Panama.

CANAL ZONE: near Balboa, sea level, *Powell 405.* VERAGUAS: Santa Fé, 2500 ft., *Powell 401.* CHIRIQUÍ: without definite locality, 4000 ft., *Powell 427.*

The plants and flowers are quite variable in size and in the degree to which the lateral sepals are connate, but the floral structure otherwise is rather remarkably uniform, particularly in view of the great geographic range. It is difficult to believe that any great weight should be attached to the degree of connation of the lateral sepals since they are found to be very easily separable, both in specimens in liquid and in flowers boiled out for examination, so that one specific concept can be transformed into another simply by a little carelessness with the dissecting instruments!

2. Notylia Cordesii L. Wms. in Ann. Mo. Bot. Gard. 26:286, *t. 21, figs. 3–4.* 1939.

Dwarf, epiphytic herbs with equitant, distichously imbricating leaves, the conduplicate bases enveloping a small, oblong-complanate, monophyllous pseudobulb 1–1.5 cm. long and about 0.5 cm. wide, the plants reminiscent of those of an *Ornithocephalus*. Leaves lanceolate to linear-lanceolate as seen in profile, ensiform, rather obliquely acuminate, the blades articulated to the conduplicate bases, 4–6 cm. long and 0.3–0.5 cm. wide. Inflorescences slender, essentially simple, subumbellate racemes, 4–6 cm. long, with 1 or 2 slender, simple, secondary inflorescences usually being produced from the nodes of the primary scape. Flowers of moderate size for the genus, on spreading, filiform pedicels subtended by lanceolate, acute or acuminate, papery bracts. Sepals free, subequal, the dorsal sepal linear-lanceolate, acuminate, about 10 mm. long and 1.5 mm. wide, the lateral sepals rather obliquely linear-lanceolate, acuminate, about 12–13 mm. long and 0.6–1 mm. wide. Petals obliquely lanceolate, acuminate, about 10 mm. long and 1.2 mm. wide. Lip with an elongate basal claw, about 4 mm. long, the middle with a biauriculate thickening, the anterior margin of which is papillose-pubescent, the blade of the lip abruptly dilated, cordate-hastate, acuminate, about 4 mm. long and 2 mm. wide, the retrorse lateral lobes distinctly serrulate. Column slender, terete, about 3 mm. long, typical of the genus.

Panama and Costa Rica.

Bocas del Toro: Mosquito Hill, *Woodson, Allen & Seibert 1932.*

Apparently closely allied to *Notylia Wullschlaegeliana* Focke. Known only from the type collection and a single subsequent collection from the Dulce Golfo region in Costa Rica.

3. Notylia latilabia A. & S. in Sched. Orch. 8:71. 1925.

Epiphytic herbs unusually large for the genus, up to about 25 cm. tall, with short, oblong-complanate, striate-rugose, monophyllous pseudobulbs up to about 1.5 cm. long and 0.8 cm. wide, completely concealed by the large ovate-lanceolate, papery bracts which become fibrous with age. Leaves oblong-lanceolate to elliptic-lanceolate, subacute, coriaceous, up to about 20 cm. long and 4–5 cm. wide, contracted below into short, conduplicate petioles. Inflorescences 1 or 2 arching or pendulous, densely flowered racemes 13–21 cm. long, produced from

the base of the current pseudobulb. Flowers relatively large for the genus, on slender pedicels subtended by narrowly triangular, acuminate bracts. Sepals concave, orange, the dorsal sepal free, fornicate, oblong-lanceolate, acute when flattened out, about 9–10 mm. long and 2.3–3 mm. wide, the lateral sepals connate to nearly the apex, forming a single bifid segment below the lip, about 8–9 mm. long and 4 mm. wide when spread out, the apices strongly reflexed. Petals falcately linear-ligular, acute, entirely white, antrorsely incurving in natural position, the apices deflexed, 7.6–8.4 mm. long and about 1.6 mm. wide. Lip shortly clawed at the base and obliquely inserted on the base of the column, the blade broadly trulliform, 6.3–7.1 mm. long (including the claw) and 4–5 mm. wide, the abruptly acuminate apex strongly recurved in natural position, the disk with a low carinate callus. Column slender, terete, glabrous, about 4.9 mm. long, typical of the genus.

Panama.

CANAL ZONE: Frijoles, sea level, *Powell 406.*

Reminiscent of *Notylia Barkeri,* but differing in the larger vegetative habit and much broader lip.

4. NOTYLIA PANAMENSIS Ames, Orchidaceae 7:112. 1922.

Epiphytic herbs rather large for the genus, up to about 18 cm. tall, with oblong, compressed, monophyllous pseudobulbs about 2 cm. long and 1 cm. wide, partially enveloped in the papery imbricating bracts which apparently soon weather away. Leaves oblong-lanceolate, obtuse and unequally bilobulate, coriaceous, up to 15 cm. long and 3–3.5 cm. wide, contracted below into very short, conduplicate petioles. Inflorescences pendulous, densely flowered racemes up to about 20 cm. long, produced from the base of the current pseudobulb. Flowers relatively large for the genus, white, on slender pedicels subtended by scarious, narrowly triangular, acuminate bracts. Sepals spreading, the dorsal sepal broadly elliptic-oblanceolate, obtuse, concave, about 7 mm. long and 5 mm. wide, the lateral sepals connate to the apex, forming a single linear-lanceolate segment below the lip, about 8 mm. long and about 2 mm. wide. Petals elliptic-lanceolate, acute, about 7 mm. long and up to 2.5 mm. wide. Lip clawed at the base, obliquely inserted on the base of the column, the blade sagittate, about 6 mm. long (including the claw) and 3 mm. wide across the base, the disk with a short, carinate callus. Column slender, terete, glabrous, about 3 mm. long.

Panama.

DARIÉN: Marragantí and vicinity, 10–200 ft., *R. S. Williams 977.*

A very distinctive species by reason of the broadly elliptic-obovate, obtuse dorsal sepal. Known only from the type collection.

5. NOTYLIA PENTACHNE Rchb. f. in Bonplandia 2:90. 1854.

Notylia gracilispica Schltr. in Fedde Rep. Sp. Nov. Beih. 17:75. 1922.

Epiphytic herbs of variable size, up to about 25 cm. tall, with oblong, compressed, monophyllous pseudobulbs up to about 2.5 cm. long and 1.2 cm. wide, usually partially enveloped in the conduplicate bases of the foliaceous bracts. Leaves and bract blades oblong-lanceolate to ligular, obtuse to subacute, coriaceous, up to about 20 cm. long and 2–5 cm. wide, contracted below into short conduplicate petioles. Inflorescences 1 or 2, usually elongate, slender, pendulous, many-flowered racemes up to about 35 cm. long, produced from the base of the current pseudobulb. Flowers of moderate size for the genus, on filiform pedicels subtended by inconspicuous linear-lanceolate, acuminate bracts. Sepals pale green, concave, the dorsal sepal lanceolate, acuminate, 8–10 mm. long and about 2–2.5 mm. wide, the apex slightly recurved, the lateral sepals connate for more than half their length, forming a single bifid segment below the lip, about 10 mm. long and 2.5 mm. wide, the subfalcate, acuminate apices divergently spreading and retrorse in natural position. Petals about 8 mm. long and 1.5 mm. wide, rather obliquely lanceolate, shortly acuminate, white with 2 minute orange spots in the center. Lip with an elongate, slender basal claw, the blade abruptly dilated and trulliform, acuminate, white, about 6 mm. long (with the claw) and up to about 2 mm. wide at the base, the disk with a short, carinate callus. Column slender, terete, distinctly papillose, about 5 mm. long.

Panama.

CANAL ZONE: along Río Chagres between Gamboa and Alajuela, 30–60 m., *Allen 961*; vicinity Gamboa, *Allen 3926*, *Pittier 2610*; Las Cruces, *Powell 3130*, Frijoles, *Powell 3318*; hills east of Panama City, *Powell 185*, *3230*. VERAGUAS: Santa Fé, about 2500 ft., *Powell 400*.

A common lowland species, closely allied to the widespread *N. Barkeri*, but differing in the papillose column.

84. MACRADENIA R. Br.

MACRADENIA R. Br. in Bot. Reg. 8: *t. 612*. 1822; Benth. & Hook. Gen. Pl. 3:586. 1883.

Rhynchadenia A. Rich. in Sagra, Hist. Fis., Pol. y Nat. Cuba 12 (Fl. Cub. Fanerog. 2):248, *t. 85*. 1853.
Serrastylis Rolfe, in Gard. Chron. 16:726. 1894.

Small, epiphytic, pseudobulbose herbs, the plants reminiscent of a *Notylia* in habit. Leaves flat, ligular to lanceolate, fleshy or coriaceous. Inflorescences nodding or pendulous racemes, produced from the base of the current pseudobulb. Flowers of moderate size or sometimes rather small, on slender pedicels subtended by small bracts. Sepals subequal, free, more or less spreading. Petals similar to the sepals or a little smaller. Lip continuous with the base of the column, erect, deeply 3-lobed, the lateral lobes rather broad, erect, embracing the column, the mid-lobe spreading. Column erect, subterete, wingless, footless, the apex sulcate, the rostellum slender, erect or slightly inclined, the clinandrium broadly cupulate, with fimbriate or dentate margins. Anther erect at the base of

the clinandrium, oblong, imperfectly 2-celled, produced into a long appendage embracing the rostellum; pollinia 2, waxy.

A small genus of tropical American epiphytes, ranging from Florida and the West Indies to Mexico, Peru, and Brazil. One species is known from Panama.

1. MACRADENIA BRASAVOLAE Rchb. f. in Bot. Zeit. 10:734. 1852.

Epiphytic herbs with narrowly linear to oblong, compressed, monophyllous pseudobulbs 2.5–4.5 cm. long and 0.4–1.0 cm. wide, enveloped below in a few imbricating, papery bracts which soon weather away. Leaves ligular, acute, coriaceous, 6.5–16 cm. long and 1.2–2.2 cm. wide, contracted below into short, slender, conduplicate petioles. Inflorescences usually solitary, arching or pendulous, many-flowered racemes up to about 25 cm. long, but often less. Flowers of moderate size, on slender pedicels, subtended by inconspicuous, linear-lanceolate, acuminate bracts. Sepals subequal, free, spreading, reddish brown with translucent green margins, the dorsal sepal lanceolate, acuminate, concave, about 18 mm. long and 5 mm. wide, the laterals linear-lanceolate, acuminate, about 20 mm. long and 4 mm. wide, the reverse surfaces with a low central keel. Petals narrower than the sepals, reddish brown with translucent green margins, linear-lanceolate, acuminate, about 16 mm. long and 3.5 mm. wide. Lip conspicuously 3-lobed, about 12–15 mm. long and 7 mm. wide when spread out, contracted at the base and continuous with the base of the column, the lateral lobes semiorbicular, white, erect, and embracing the column in natural position, the obliquely subacute anterior margins reflexed, the mid-lobe reddish brown, narrowly linear, acuminate, about 9 mm. long and 1 mm. wide, the disk with a low, fleshy, linear-oblong, obscurely striate callus. Column 6–7 mm. long, subterete, narrowed below, gradually dilated above, the margins of the clinandrium conspicuously lacerate, the rostellum narrowly linear-acuminate.

Guatemala, Nicaragua, Panama, Colombia, and probably adjacent territories.

PANAMÁ: hills east of Panama City, vicinity Juan Díaz, *Powell 3491, 3501;* without definite locality, *Fairchild s. n.;* vicinity Pacora, *Allen 2357.*

85. TELIPOGON HBK.

TELIPOGON HBK. Nov. Gen. & Spec. 1:335, *t. 75.* 1815; Benth. & Hook. Gen. Pl. 3:587. 1883; Kränzl. in Ann. Nat. Hist. Hofmus. Wien 33:9. 1919.

Telopogon Mutis, ex Spreng. Anleit. 2[1]:291. 1817.
Thelypogon Spreng. Syst. Veg. 3:742. 1826.

Epiphytic herbs without pseudobulbs, the foliaceous stems short or elongate. Leaves usually narrow, distichous, congested or relatively distant, the blades articulated to the conduplicate bases, often deciduous, pergameneous, coriaceous or fleshy. Inflorescences slender, erect, few-flowered, pseudoterminal racemes produced from the uppermost leaf axils and usually exceeding the leaves in length. Flowers usually large in relation to the size of the plant, rarely small, on slender

pedicels subtended by small, inconspicuous bracts. Sepals subequal, free, broadly spreading, narrow, usually almost completely hidden by the petals and lip. Petals very broad, spreading, much exceeding the sepals in width, distinctly veined. Lip sessile at the base, broadly spreading, usually undivided, similar to the petals or a little broader, rarely smaller, prominently radiate or reticulate-veined. Column very short, stout, wingless, footless, densely setose or hispid on all sides or sometimes only at the apex, the rostellum terminal, erect, usually prominent. Anther erect, applied to the rostellum, distinctly 2-celled; pollinia 4, waxy.

Perhaps 60 species of small, tropical highland epiphytes, ranging from Costa Rica to Brazil and Peru. Two species are known from Panama.

a. Lip more than 2 cm. wide, radiate-veined, without secondary transverse nerves ..... 2. T. RADIATUS
aa. Lip less than 2 cm. wide, reticulate-veined, with distinct secondary transverse nerves ..... 1. T. DENDRITICUS

1. TELIPOGON DENDRITICUS Rchb. f. Otia Bot. Hamb. 1:6. 1878.

Dwarf, epiphytic herbs with short foliaceous stems 3 cm. tall (in our specimen). Leaves linear-lanceolate, acute, subcoriaceous, the blades 1.5–2 cm. long and 0.25–0.3 cm. wide, contracted below into a short, sheathing petiole. Inflorescences 1- to 2-flowered scapes up to about 6 cm. long, produced from the subterminal leaf axils. Flowers in our specimen about 2.5 cm. in diameter, pale greenish yellow, veined brown. Sepals narrowly triangular, acuminate, apparently 3-nerved, about 1 cm. long and 0.3 cm. wide. Petals incomplete in our specimen, apparently broadly rhombic, 9-nerved, probably about 1.2 cm. long and 1.2 cm. wide. Lip similar to the petals, transversely rhombic-ovate, obtuse, minutely apiculate, about 1.5 cm. long and 1.9 cm. wide, distinctly reticulate-veined, apparently with 19 primary veins and many secondary transverse nervules, the disk minutely puberulent. Column densely setose, the slender rostellum prominently projecting, as in the genus.

Panama and Colombia.

CHIRIQUÍ: vicinity Bajo Chorro, headwaters of the Río Caldera, 1900 m., *Woodson & Schery 694.*

The vegetative portion of our single specimen is very small, but the flower, although lacking the apices of the petals, seems to compare very well with the type description. The species apparently is allied to *Telipogon parvulus* of Costa Rica, but differs in the larger flowers and the distinct reticulate venation of the lip.

2. TELIPOGON RADIATUS Rchb. f. in Linnaea 41:70. 1877.

Dwarf, caespitose, epiphytic herbs, the distichous, congested, foliaceous stems 3.5–8 cm. tall. Leaves elliptic-lanceolate to ligular, acute, subcoriaceous, the blades 2–5.5 cm. long and 0.5–1 cm. wide, contracted below into short, conduplicate, imbricating petioles. Inflorescences 1 or 2 slender, erect, few-flowered racemes up to about 9 cm. long, produced from the subterminal leaf axils. Flowers averaging about 3.5 cm. in diameter, golden yellow striped with rich brown,

the elongate, slender pedicels subtended by very short, inconspicuous, narrowly triangular bracts. Sepals narrowly triangular, acuminate, 3-nerved, 1.2–1.5 cm. long and 0.35–0.4 cm. wide, the central nerves thickened and carinate on the outer surfaces. Petals broadly rhombic-ovate, shortly and distinctly acute, much exceeding the sepals in width, 9- to 11-nerved, 2–2.5 cm. long and 1.8–2.1 cm. wide. Lip subequal to the petals, the sessile base adnate to the base of the column, the blade transversely rhombic-ovate, obtuse, minutely apiculate, 19- to 21-nerved, the nerves radiate without secondary transverse nervules, about 2 cm. long and 2.2–2.7 cm. wide, the disk with a short, rounded, densely pilose callus. Column about 5 mm. long, densely setose, the slender rostellum prominently projecting.

Panama, Colombia, and Peru.

CHIRIQUÍ: vicinity Casita Alta, Finca Lérida, eastern slopes of Chiriquí Volcano, 1500–2000 m., *Woodson, Allen & Seibert 961*.

Our specimens differ from the combined concepts of Reichenbach f. and Kränzlin in the slightly smaller, apiculate lip, but otherwise appear to be identical. Evidently closely allied to *Telipogon ampliflorus* C. Schweinf. of Costa Rica, but differing in the radiate, rather than reticulate, venation of the lip and in the much more densely setose column.

86. DICHAEA Lindl.

DICHAEA Lindl. Gen. & Spec. Orch. Pl. 208. 1833; Benth. & Hook. Gen. Pl. 3:556. 1883; Kränzl. in Engler, Pflanzenr. IV, Fam. 50 (Heft 83):33 1923.

Fernandezia R. & P. Fl. Peru & Chil. Prodr. 123. 1794 (in part).
Epithecia Knowl. & Westc. Fl. Cab. 2:167, *t. 87*. 1838.
Epithecium Benth. & Hook. Gen. Pl. 3:529, 1239. 1883, sphalm.
Dichaeopsis Pfitz. in Engler & Prantl, Pflanzenfam. 2^6:207. 1888.

Epiphytic herbs without pseudobulbs, the erect or pendulous, monopodial, foliaceous stems enveloped in the conduplicate, distichously imbricating leaf bases. Leaf blades short to elongate, pergameneous to coriaceous, articulated and ultimately deciduous, or connate with the sheathing bases and persistent. Inflorescences 1 to several short, 1-flowered scapes produced from the axils of the leaves. Flowers relatively small. Sepals subequal, free, spreading, the laterals rather obliquely inserted, the bases sometimes forming a mentum with the column foot. Petals subequal to the sepals or narrower. Lip affixed to the base of the column, usually clawed, rarely sessile, the blade usually 3-lobed, often more or less anchoraeform when spread out, infrequently entire, the lateral lobes (if present) triangular to linear, short or elongate, usually retrorse in natural position, sometimes reduced to acute angular projections at the base of the blade, the disk usually without a callus. Column short, erect, wingless or rarely narrowly winged, the margins of the clinandrium often denticulate, the under-surface of the column sometimes with a glabrous or pubescent infra-stigmatic ligule, the base of the column produced into a short foot. Capsule ovoid or oblong, muricate, setose or smooth.

A difficult genus of tropical American epiphytes, ranging from Mexico and the West Indies to Brazil and Peru. Five species are known to occur in Panama.

a. Leaf blades not articulated, not deciduous.
  b. Leaf margins densely ciliate..... 1. D. CILIOLATA
  bb. Leaf margins not ciliate..... 3. D. MURICATA
aa. Leaf blades articulated to the sheathing bases, deciduous.
  b. Leaves broadly oblong-ligular, obtuse, minutely apiculate, 8 mm. wide or more..... 2. D. MORRISII
  bb. Leaves narrowly linear-lanceolate, acute or acuminate, 6 mm. wide or less.
    c. Leaves 4 cm. long or less, usually of alternating groups of unequal length..... 4. D. PANAMENSIS
    cc. Leaves more than 6 cm. long, all of about equal length..... 5. D. POWELLII

1. DICHAEA CILIOLATA Rolfe, in Kew Bull. 83. 1917.

Small, epiphytic herbs, the distichous, often branching, densely foliaceous stems up to about 15 cm. tall and 8–10 mm. wide. Leaf blades elliptic-oblong, acute, distinctly keeled below, the margins densely ciliate, 2.5–3 mm. long and 2.5–3 mm. wide at the base, the blades not articulated to the sheathing bases, not deciduous. Inflorescences slender, 1-flowered scapes 4–6 mm. long, produced from the upper leaf axils, the apex with 2 short, spathaceous bracts enveloping the ovary. Flowers small, the sepals and petals pale buff with red-purple spots and bars, the lip white marked with purple. Sepals free, the dorsal sepal oblong, acute, 5.5–7 mm. long and about 2 mm. wide, the lateral sepals ovate, acute to shortly acuminate, rather concave at the base, 6–8 mm. long and 2–3 mm. wide, the outer surfaces of the sepals sparsely verrucose. Petals rather obliquely elliptic-lanceolate, acute, about 7 mm. long and 3 mm. wide. Lip shortly clawed at the base, the claw more or less geniculate in profile and continuous with the base of the column, the blade anchoraeform when spread out, 3-lobed, the narrowly linear, subfalcate, lateral lobes retrorsely incurving, the mid-lobe triangular, broadly acute, the lateral margins more or less erect in natural position, the entire lip (including the claw) about 4.5–6.4 mm. long and 6–8 mm. wide. Column rather stout, wingless, 3–5 mm. long, the lower surface with a short infra-stigmatic ligule. Capsule densely muricate.

Costa Rica and Panama.

CHIRIQUÍ: without definite locality, 4000 ft., *Powell 435*.

This concept is very closely allied to that of *Dichaea hystricina* Rchb. f. and may ultimately prove to be conspecific.

2. DICHAEA MORRISII Fawcett & Rendle, in Jour. Bot. 48:107. 1910.

Epithecia Morrisii Schltr. in Orchis 9:26. 1915.
Dichaea Bradeorum Schltr. in Fedde Rep. Sp. Nov. Beih. 19:154. 1923.

Epiphytic herbs, the erect or pendulous stems up to about 40 cm. tall, enveloped in the very broad, conduplicate bases of the distichously imbricating leaves, the plants superficially resembling some of the pseudobulbless Maxillarias. Leaf blades articulated to the sheathing bases and ultimately deciduous below,

elliptic-oblong to broadly ligular, obtuse and minutely apiculate, subcoriaceous, 3–7 cm. long and 0.8–1.5 cm. wide. Inflorescences 1-flowered scapes, about 8 mm. long, produced from the upper leaf axils, the peduncle provided at the apex with 2 large spathaceous bracts which completely envelop and conspicuously exceed the ovary. Flowers large for the genus, the sepals and petals pale green striped deep lavender, the lip deep lavender. Sepals lanceolate, acuminate, slightly concave, the margins minutely ciliate, about 11–15 mm. long and 5–7 mm. wide, the lateral sepals rather oblique and a little broader than the dorsal sepal, with a rather indistinct central keel on the outer surface. Petals subequal to the dorsal sepal, lanceolate, acuminate, slightly concave, about 10–12 mm. long and 3.5–4 mm. wide, the margins minutely ciliate. Lip fleshy, the linear-oblong, slightly arcuate claw narrowed at the base and affixed to the very short column foot, the blade dilated and 3–lobed, more or less anchoraeform, the lateral lobes short to elongate, ligular to subular, sometimes falcately triangular-linear, usually more or less retrorse in natural position, the mid-lobe rather narrowly triangular, usually reflexed, acute or shortly acuminate, minutely papillose on both sufaces, the entire lip (including the claw) about 9–10 mm. long and 5–6 mm. wide. Column very stout, the lateral margins narrowly winged, 4–6 mm. long, the clinandrium very broad, with serrulate margins, the under-surface of the column with a subquadrate, puberulent, slightly emarginate, infra-stigmatic ligule, the base of the column produced into a very short foot. Capsule densely setose.

Jamaica, Santo Domingo, Costa Rica, and Panama.

COCLÉ: hills north of El Valle de Antón, 1000 m., *Allen 2874*. CHIRIQUÍ: vicinity Bajo Chorro, 6000 ft., *Davidson 221*.

Apparently a very variable species. The collection cited above from El Valle de Antón is rather atypical in the narrower leaves and the much reduced lateral lobes of the lip.

3. DICHAEA MURICATA (Sw.) Lindl. Gen. & Sp. Orch. Pl. 209. 1833.

Cymbidium muricatum Sw. in Nov. Act. Soc. Upsal. 6:71. 1799.
Dichaea latifolia Lindl. Gen. & Sp. Orch. Pl. 208. 1833.
Dichaea Moritzii Rchb. f. in Nederl. Kruidk. Arch. 4:328. 1858.
Dichaea muricata Lindl. *β latifolia* Lindl. ex Griseb. Fl. Brit. W. Ind. 624. 1864.
Dichaea muricata Lindl. var. *Moritzii* Cogn. in Mart. Fl. Bras. 3^6:488. 1906.
Dichaea ovatipetala Schltr. in Fedde Rep. Sp. Nov. Beih. 19:266. 1923.
Dichaea similis Schltr. loc. cit. 307. 1923.
Dichaea verrucosa Ames & Schweinf. in Sched. Orch. 8:83. 1925.

Epiphytic herbs with elongate, pendulous, monopodial, foliaceous stems, up to about 60 cm. long, completely enveloped in the persistent, distichous leaves. Leaf blades elliptic-oblong to ligular, obtuse to acute, with entire margins, the under-surface distinctly keeled, terminating at the apex in a minute to relatively elongate apicule, the blades often rather obliquely spreading, not articulated to the sheathing bases, not deciduous, 10–20 mm. long and 4–7 mm. wide. Peduncles slender, 1-flowered, 1–2 cm. long, produced from the upper leaf axils. Flowers of moderate size for the genus. Sepals elliptic-lanceolate,

shortly acuminate, about 7.5 mm. long, 2.5 mm. wide, the outer surfaces usually more or less verrucose. Petals subequal to the sepals, elliptic-lanceolate, acute to shortly acuminate, about 7 mm. long and 2 mm. wide. Lip anchoraeform in outline when spread out, the broad claw contracted at the base and affixed to the base of the column, the blade abruptly dilated and distinctly 3-lobed, the short, acute or acuminate lateral lobes more or less falcately retrorse in natural position, the mid-lobe shortly triangular, acute or apiculate, the entire lip, including the claw, about 6 mm. long and 3.2 mm. wide. Column stout, about 2.5–3 mm. long, the under-surface with a small infra-stigmatic ligule, the broad clinandrium hooded, as in the genus. Capsule densely muricate.

Mexico to Brazil; Cuba to Lesser Antilles.

COLÓN: summit of Cerro Santa Rita, 1200–1500 ft., *Allen & Allen 5112.* COCLÉ: western slope and summit of Cerro Valle Chiquito, 700–800 m., *Seibert 512;* vicinity El Valle de Antón, 600–1000 m., *Allen 1249.* CHIRIQUÍ: vicinity Casita Alta, Finca Lérida, eastern slopes of Chiriquí Volcano, 1500–2000 m., *Woodson, Allen & Seibert 834;* vicinity Cerro Punta, headwaters of the Río Chiriquí Viejo, 2000 m., *Allen 1529.*

Most of the specimens cited above are sterile, and the determinations must be regarded as provisional. In particular, the collections from Chiriquí Province appear quite atypical in the narrower leaves and may possibly represent *Dichaea trichocarpa* (Sw.) Lindl.

4. DICHAEA PANAMENSIS Lindl. Gen. & Sp. Orch. Pl. 209. 1833.

Epithecia panamensis Schltr. in Orchis 9:25. 1915.
Dichaeopsis panamensis (Lindl.) Schltr. in Beih. Bot. Centralbl. 36^2:519. 1918.

Epiphytic herbs with slender, monopodial, often rather flexuose foliaceous stems, 4 to about 18 cm. tall. Leaves 2-ranked on the stems, narrowly linear-lanceolate, acute and apiculate or acuminate, subcoriaceous, often glaucous, usually in alternating groups of unequal length, the blades articulated to the sheathing bases and ultimately deciduous below, 1–4 cm. long and 0.2–0.45 cm. wide. Peduncles filiform, 1-flowered, produced from the axils of the leaves. Flowers small, translucent, white spotted with pink or purple. Sepals free, the dorsal sepal oblong-lanceolate, acute, slightly concave, about 5 mm. long and 2 mm. wide, the lateral sepals obliquely oblong-lanceolate, acute, slightly concave, about 6 mm. long and about 2.5 mm. wide at the base. Petals shorter and broader than the sepals, rather obliquely elliptic-oblong, shortly acute, about 4.5 mm. long and 3.5 mm. wide. Lip sagittate to obovate-spatulate in outline when spread out, the ligular claw slightly arcuate in profile, abruptly contracted at the base and continuous with the short column foot, the blade abruptly dilated and 3-lobed, the short, acute lateral lobes retrorse in natural position, the mid-lobe broadly triangular, shortly acute with a short central keel on the lower surface at the apex, the entire lip, including the claw, about 7 mm. long and 6 mm. wide. Column wingless, stout, about 3 mm. long, the apex truncate, the under-surface with a short, infra-stigmatic ligule, the base produced into a very short foot. Anther and pollinia typical of the genus.

Fig. 212. *Dichaea panamensis*

Mexico, British Honduras, Guatemala, Honduras, Costa Rica, and Panama.

CANAL ZONE: hills between Rio Grande and Puerto Vidal, on the road to Arraiján, 50–150 m., *Pittier 2716;* Barro Colorado Island, Gatún Lake, 100 m., *Wetmore & Abbe 249;* Miraflores, *Powell 3133;* Pedro Miguel, *Powell 3033;* Río Indío, Madden Lake area, 70–80 m., *Dodge & Allen 17312;* Chagres, *Fendler 333.* PANAMÁ: without definite locality, *Cuming 1292;* low thick scrub along the Río Tecúmen, north of the Chepo road, about 30 m., *Hunter & Allen 221;* Chiva-Chiva, *Powell 3021, 3066;* Río Tapía, *Standley 30671;* hills east of Panama City, *Powell 175;* vicinity Paja, *Powell 3139, 3240;* Chorrera, *Powell 3078;* Panama Bay, Perlas Archipelago, San José Island, *Johnston 400, 1013, 1216, 1219.* COCLÉ: Bismarck, above Penonomé, 2000–3000 ft., *R. S. Williams 441;* vicinity El Valle de Antón, 600–1000 m., *Fairchild s. n., Allen 1246.*

A very common lowland species, widely distributed in Central America.

5. DICHAEA POWELLII Schltr. in Fedde Rep. Sp. Nov. Beih. 17:90. 1922.

Dichaea Brenesii Schltr. loc. cit. 19:264. 1923.

Erect, epiphytic herbs with unbranching, monopodial, foliaceous stems 15–45 cm. tall, enveloped in the conduplicate bases of the many, distichously imbricating leaves. Leaf blades spreading, linear-ligular, acute to acuminate, coriaceous, 6–13.5 cm. long and 0.3–0.6 cm. wide, the blades articulated to the persistent sheathing bases and ultimately deciduous below. Inflorescences short, slender, 1-flowered scapes about 1.5–2 cm. long, produced from the leaf axils, terminating at the apex in a short, broadly cucullate bract which envelops and exceeds the ovary. Flowers relatively large for the genus, the sepals and petals pale green to white, the lip purple or pale green heavily marked with purple. Sepals free, glabrous, ovate-lanceolate to oblong-lanceolate, acute, 8–10 mm. long and 4 mm. wide. Petals elliptic-ovate, obtuse and apiculate to shortly acute, slightly concave, about 10 mm. long and 4 mm. wide. Lip with a broad ligular claw at the base, the blade dilated and 3-lobed, broadly trulliform when spread out, deeply concave in natural position, the short, obtuse to acute lateral lobes somewhat retrorse, the mid-lobe semi-orbicular when spread out, more or less conduplicate and shortly acute in natural position, the entire lip, including the claw, about 8 mm. long and 8 mm. wide. Column broad, stout, about 4–6 mm. long, the under-surface with a short, minutely papillose, infra-stigmatic ligule. Capsule glabrous.

Honduras, Costa Rica, and Panama.

PANAMÁ: foothills east of Panama City, *Powell 23.* COLÓN: Cerro Santa Rita, 1200 ft., *Allen & Fairchild 5186, 5193.*

87. CAMPYLOCENTRUM Benth.

CAMPYLOCENTRUM Benth. in Jour. Linn. Soc. 18:337. 1881; Benth. & Hook. Gen. Pl. 3:585. 1883 (as *Campylocentron*).

Todaroa A. Rich. in Ann. Sci. Nat. III, 3:28. 1845.

Pseudobulbless, epiphytic herbs with either distichous, monopodial, leafy stems, or stemless and leafless clusters of thickened roots. Leaves oblong or ligular, coriaceous, sometimes absent. Inflorescences short, usually densely flowered racemes, produced from the axils of the leaves or from the centers of the root clusters. Flowers minute, often more or less distichously arranged on the scape. Sepals subequal, free, connivent, or with the apices spreading. Petals subequal to the sepals or sometimes smaller. Lip sessile at the base of the column and produced into an elongate, often recurved spur, the blade entire or 3-lobed, subequal to the sepals in length, often with the lateral margins more or less convolute at the base. Column very short, wingless, the base without a foot. Anther terminal, operculate, incumbent, 2-celled; pollinia 2, waxy.

About 30 species of tropical American epiphytes, ranging from Florida, Mexico, and the West Indies to Brazil. Three species are known from Panama, but one is represented only by sterile material.

a. Plants entirely leafless, consisting of spreading clusters of thickened roots..... 3. C. sp.
aa. Plants with monopodial, foliaceous stems.
  b. Leaves less than 1.5 cm. long. Highland species..... 1. C. Brenesii
  bb. Leaves 4–9 cm. long. Lowland species..... 2. C. micranthum

1. Campylocentrum Brenesii Schltr. in Fedde Rep. Sp. Nov. Beih. 19:268. 1923.

Small, epiphytic herbs with erect, distichous, monopodial, foliaceous stems 2–12 cm. tall. Leaves spreading, the blades oblong to elliptic-oblong, rather obliquely acute, coriaceous, about 7–14 mm. long and 3.5–5 mm. wide, articulated to the sheathing bases and ultimately deciduous below. Inflorescences short, lateral, 5–10-flowered racemes produced from the leaf axils. Flowers minute, distichously arranged on the scape. Sepals narrowly lanceolate-ligular, acute, about 1.75 mm. long, the laterals usually rather oblique. Petals subequal to the sepals, rather obliquely linear-lanceolate, acute. Lip 3-lobed, about 1.75 mm. long and 1 mm. wide, the lateral lobes short, obtuse, the mid-lobe narrowly triangular, the base produced into a somewhat laterally compressed, obtuse spur about 1 mm. long. Column very short, typical of the genus.

Guatemala, Costa Rica, and Panama.

chiriquí: vicinity Bajo Mono and Quebrada Chiquero, 1500 m., *Woodson & Schery 579.*

2. Campylocentrum micranthum (Lindl.) Rolfe in Orch. Rev. 11:245. 1903.

Angraecum micranthum Lindl. in Bot. Reg. 21: *t. 1772.* 1836.
Angraecum brevifolium Lindl. loc. cit. n. s. 3: sub *t. 68.* 1840.
Angraecum Lansbergii Reichb. f. in Nederl. Kruidk. Arch. 4:316. 1859.
Aeranthus micranthus Reichb. f. in Walp. Ann. 6:901. 1864.
Aeranthus Lansbergii Reichb. f. loc. cit. 1864.
Campylocentrum panamense Ames, Orchidaceae 7:88. 1922.
Campylocentrum peniculus Schltr. in Fedde Rep. Sp. Nov. Beih. 17:91. 1922.

Fig. 213. *Campylocentrum micranthum*

Epiphytic herbs, with more or less flexuose, monopodial, foliaceous stems, up to about 35 cm. long, enveloped in the conduplicate bases of the distichous leaves. Roots alternating with the leaves and equidistantly distributed along the stem. Leaves broadly ligular to elliptic-oblong, obtuse to unequally bilobed at the apex, the blades about 4–9 cm. long and 1.2–2 cm. wide, articulated to the persistent, sheathing bases and ultimately deciduous below. Inflorescences short, lateral, densely flowered racemes 3–4 cm. long, produced from the sides of the stems just below the point of emergence of the roots. Flowers very small, white or yellowish white, distichously arranged on the scape. Sepals of about equal length, linear-ligular, shortly acuminate, slightly concave, the margins of the lower portions connivent, with the apices spreading, 4–4.5 mm. long and about 0.75 mm. wide; lateral sepals usually rather oblique. Petals narrowly ligular, rather concave, acute, subequal to the dorsal sepal in length, about 4 mm. long and 0.75–1 mm. wide. Lip 3-lobed, about equaling the lateral sepals in length, the sessile base affixed to the base of the column and produced into an elongate, obtuse, incurving spur, about 4 mm. long, the short, lateral lobes of the blade acute or semiovate, erect in natural position, about 1.5 mm. wide when spread out, the mid-lobe narrowly triangular or linear-ligular, rather acute, about 2.5 mm. long and 0.75 mm. wide.

Cuba, Santo Domingo, Jamaica, Trinidad, Mexico to British Guiana, Brazil and Peru.

CANAL ZONE: Las Cascadas, *Powell 184, Standley 25748, 29699;* drowned forest near Vigía and San Juan de Pequení, Madden Lake area, 66 m., *Dodge, Steyermark & Allen 16582;* in woods, near Gatún, *Sutton Hayes 988;* vicinity Gamboa, 100 m., *Allen 3444, Pittier 2612.* BOCAS DEL TORO: Water Valley, vicinity Chiriquí Lagoon, *von Wedel 1386, 1451, 1483, 1655, 1707.*

3. CAMPYLOCENTRUM sp.

There is a specimen in the Ames Herbarium of a leafless species of *Campylocentrum* from Panama, the single inflorescence being very immature and without flowers. It seems likely that it represents *Campylocentrum fasciola* (Lindl.) Cogn. which is widely distributed from Mexico and the West Indies to Brazil.

PANAMÁ: hills east of Panama City, *Powell 320.*

INDEX

Numbers represent italicized page numbers at bottom of pages. Synonyms in *italics*.

A

Achroanthes, 234; *mianthemifolia*, 235; *montana*, 236
Acineta, 381; chrysantha, 382; *densa*, 382; *fulva*, 382; *Colmani*, 382; *Humboldtii*, 382; *sella-turcica*, 382; superba, 382; *Warscewiczii*, 382
Acoidium, 475
Acostaea, 190; costaricensis, 191
Acropera, 395; *armeniaca*, 396; *cornuta*, 396
Adipe, 408
Aeranthus Lansbergii, 579; *micranthus*, 579
Allen, Paul H., 337, 469
Ames, Blanche, 337
Ames, Oakes, 337
Amphiglottis, 247
Angraecum brevifolium, 579; *Lansbergii*, 579; *micranthum*, 579
Anguloa superba, 382
Arethusa picta, 156; *racemosa*, 150
Aspasia, 499; epidendroides, 501, var. principissa, 501; *fragrans*, 501; *principissa*, 501; pusilla, 503; *Rousseauae*, 501
Auliza, 247; *ciliaris*, 257

B

Baptistonia, 514
Barkeria, 247
Batemannia Burtii, 429; *grandiflora*, 417
Beloglottis, 152; *costaricensis*, 154
Bifrenaria, 408; picta, 409
Bletia, 339; *capitata*, 129; *Lankesteri*, 342; *pallida*, 340; purpurea, 340; reflexa, 342; *verecunda*, 340
Bletiana, 339
Bletilla, 339
Bolbophyllaria, 344; *aristata*, 345; *pachyrrachis*, 345
Bollea Wendlandiana, 421
Bonatea pauciflora, 120
Bothriochilus, 330; macrostachyus, 330
Brachystele, 152; *aguacatensis*, 153; *guyanensis*, 153
Brassavola, 316; acaulis, 318; *lineata*, 318; nodosa, 316; *scaposa*, 316; *venosa*, 316
Brassia, 505; Allenii, 506; caudata, 506; chlorops, 509; Gireoudiana, 510; *Lawrenciana* var. *longissima*, 511; *Lewisii*, 508; longissima, 511; *longissima*, 511, var. *minor*, 508; *parviflora*, 509
Broughtonia alba, 436
Bulbophyllum, 344; aristatum, 345; pachyrrhachis, 345; *vinosum*, 345
Burlingtonia, 478

C

Calanthe, 337; mexicana, 339
Camaridium, 431; *affine*, 442; *arachnites*, 446; *Biolleyi*, 439; *Bradeorum*, 440; *ctenostachys*, 446; *dendrobioides*, 447; *exaltatum*, 448; *grandiflorum*, 440; *Jimenezii*, 447; *latifolium*, 460; *minus*, 455; *nutantiflorum*, 464; *ochroleucum*, 442; *simile*, 447
Campylocentron, 578
Campylocentrum, 578; Brenesii, 579; fasciola, 581; micranthum, 579; *panamense*, 579; *peniculus*, 579; sp., 581
Catachaetum, 359
Catasetum, 358; bicolor, 360; *Brenesii*, 363; eburneum, 362; *gongoroides*, 360; Oerstedii, 363; *rostratum*, 363; *scurra*, 367; *serratum*, 365; suave, 365; viridiflavum, 365; Warczewitzii, 367
Cattleya, 312; Skinneri var. autumnalis, 313
Ceratochilus, 389; *oculatus*, 391
Chondrorhyncha, 419, 427; aromatica, 421; discaloglossa, 421; costaricensis, 422; discolor, 423; *estrellensis*, 421; lactea, 423; *Lipscombiae*, 424; marginata, 424
Chysis, 343; aurea var. maculata, 343
Cladobium, 318
Cleistes, 123; *rosea*, 123
Clowesia, 359
Coelia macrostachya, 330, var. *genuina*, 331, var. *integrilabia*, 331
Coeliopsis, 376; hyacinthosma, 377
Coppensia, 514
Coryanthes, 402; *Albertinae*, 403; *Hunteriana*, 403; maculata, 403; *Powellii*, 403; *splendens*, 403
Corymbis, 161; *flava*, 161
Corymborchis, 161; *flava*, 161
Corynanthes, 402
Corythantes, 402
Craniches, 148; muscosa, 148; *oligantha*, 146; *stachyodes*, 147

Cryptocentrum, *472*; gracilipes, *473*; inaequisepalum, *473*; latifolium, *474*; Standleyi, *475*
Cryptophoranthus, *176*; *acaulis*, *208*; lepidotus, *178*; *Powellii*, *209*
Cryptosaccus, *546*
Cryptosanus, *546*; *scriptus*, *548*
Cuculina, *358*
Cuitlanzina, *492*
Cuitlauzina, *492*
Cuitlauzinia, *492*
Cybelion, *476*
Cyclopogon, *152*; *Prasophyllum*, *154*
Cyclosia, *354*
Cycnoches, *368*; *Amparoanum*, *373*; aureum, *369*; *barbatum*, *389*; chlorochilon, *370*; *densiflorum*, *373*; Dianae, *372*; Egertonianum, *373*; *glanduliferum*, *373*; *guttulatum*, *373*; *pachydactylon*, *373*; *pauciflorum*, *373*; *peruvianum*, *373*; *Powellii*, *372*; *Rossianum*, *373*; *stelliferum*, *373*; *stenodactylon*, *373*; Tonduzii, *374*; ventricosum, *376*; *ventricosum* var. *Egertonianum*, *373*; *Warszewiczii*, *370*
Cymbidium muricatum, *575*; *ochroleucum*, *442*; *pusillum*, *540*; *subulatum*, *488*; *trinerve*, *349*; *utriculatum*, *353*
Cypripedium caudatum, *116*, var. *roseum*, *116*, var. *Warscewiczii*, *116*; *Hincksianum*, *117*; *Humboldti*, *116*; *longifolium*, *117*; *Warszewiczianum*, *116*
Cyrtochilos, *514*
Cyrtochilum, *514*
Cyrtopera, *347*; *longifolia*, *347*; *Woodfordii*, *347*
Cyrtopodium, *349*; punctatum, *349*, var. *Saintlegerianum*, *349*; *Saintlegerianum*, *349*; *speciosissimum*, *349*; *tigrinum*, *349*; *Willmorei*, *349*; *Woodfordii*, *347*

D

Dendrobium album, *436*; *longifolium*, *347*; *ruscifolium*, *206*; *utricularioides*, *478*
Deppia, *410*
Diacrium, *310*; bilamellatum, *312*; *bilamellatum* var. *Reichenbachianum*, *312*
Dichaea, *573*; *Bradeorum*, *574*; *Brenesii*, *578*; ciliolata, *574*; *latifolia*, *575*; *Moritzii*, *575*; Morrisii, *574*; muricata, *575*; *muricata* var. *latifolia*, *575*, var. *Moritzii*, *575*; *ovatipetala*, *575*; panamensis, *576*; Powellii, *578*; *similis*, *575*; trichocarpa, *576*; *verrucosa*, *575*
Dichaeopsis, *573*; *panamensis*, *576*
Dicrypta, *431*; *Baueri*, *445*; *crassifolia*, *445*; *iridifolia*, *466*; *irisphyta*, *466*
Didactyle, *344*
Dillon, Gordon W., *337*
Dimerandra, *247*; *stenopetala*, *270*
Dinema, *247*; *paleaceum*, *256*
Diothonaea imbricata, *245*; *oppositifolia*, *245*

E

Eckardia, *384*
Elleanthus, *128*; aurantiacus, *130*; capitatus, *129*; hymenophorus, *129*; laxus, *132*; *linifolius*, *132*; muscicola, *133*; *Tonduzii*, *130*; *trilobatus*, *130*
Encyclia, *247*; *atropurpurea*, *255*, var. *leucantha*, *255*, var. *rhodoglossa*, *255*; *Brenesii*, *262*; *campylostalix*, *256*; *chiriquensis*, *269*; *gravida*, *262*; *Hunteriana*, *262*; *Powellii*, *261*; *ramonensis*, *261*; *tessalata*, *259*; *Tonduziana*, *262*
Epidanthus, *335*; paranthicus, *336*
Epidendrum, *247*; *aberrans*, *276*; abbreviatum, *254*; *Adolphi*, *284*; *alanjense*, *262*; *Allenii*, *270*; *aloifolium*, *264*; *amandum*, *262*; anceps, *273*; atropurpureum, *255*, var. laciniatum, *255*; *auritum*, *256*; *aropurpureum*, *255*; *baculibulbum*, *260*; *benignum*, *290*; *biflorum*, *301*; *bilamellatum*, *312*; bisulcatum, *273*; *Boissierianum*, *301*; Brassavolae, *256*; *brevicaule*, *304*; Boothii, *255*; caligarium, *275*; campylostalix, *256*; *cardiophorum*, *303*; Carolii, *276*; *carthaginense*, *522*; *caudatum*, *506*; centradenia, *276*; centropetalum, *276*; *chiriquense*, *269*; *chlorocorymbos*, *281*; *chondranthum*, *285*; ciliare, *257*, var. Oerstedii, *259*; cochleatum, *259*; cocleense, *277*; *colonense*, *306*; condylochilum, *259*; confertum, *277*; *congestoides*, *304*; congestum, *278*; coriifolium, *278*; *coriifolium* var. *purpurascens*, *278*; *costaricense*, *259*; crassilabium, *260*; criniferum, *279*; cryptanthum, *279*; *curvicolumna*, *281*; *cuspidatum*, *257*; *Cycnostalix* *268*; *Deamii*, *259*; dentiferum, *279*; dentilobum, *281*; difforme, *281*, var. firmum, *283*, var. simulacrum, *283*; eburneum, *283*; ellipsophyllum, *284*; Endresii, *284*; *equitans*, *285*; equitantifolium, *285*; exasperatum, *285*; *falcatum* var. *Zeladoniae*, *264*; *firmum*, *283*; *flexicaule*, *301*; *floribundum*, *293*; fragrans, *260*, var. *pachypus*, *260*; *fuscopurpureum*, *278*; *gibbosum*, *295*; *gigas*, *349*, *519*; *glandulosum*, *268*; *gravidum*, *262*; *Hoffmannii*, *261*; Hunterianum, *286*; ibaguense, *286*; imatophyllum, *287*; *imbricatum*, *301*, var. *angustifolium*, *301*; incomptum, *287*; ionophlebium, *261*; isomerum, *289*; *Isthmi*,

293; *labiatum*, 547; *latilabrum*, 281; *leprosum*, 276; lividum, 310; lockhartioides, 289; *lorifolium*, 287; *leucocardium*, 283; *macrochilum*, 255, var. *roseum*, 255; *magnibracteatum*, 278; *majale*, 283; microdendron, 289; *modestiflorum*, 301; *Mooreanum*, 262; moyobambae, 290; *muscifera*, 273; *myodes*, 298; nocturnum, 291, var. *panamense*, 291; *nodosum*, 316; obesum, 292; *Oerstedii*, 259; oncidioides var. gravidum, 262, var. Mooreanum, 262, var. ramonense, 261; *oppositifolium*, 245; Ottonis, 264; *pachycarpum*, 261; *paleaceum*, 256; *palmense*, 278; panamense, 292; paniculatum, 293; *paranthicum*, 336; Parkinsonianum, 264; pendens, 294; *peraltense*, 262; *pergameneum*, 297; physodes, 295; *piliferum*, 293; *platycardium*, 267; *platychilum*, 279; platystigma, 295; polyanthum, 297, var. myodes, 298; porpax, 298; *porphyrophyllum*, 298; Powellii, 298; prismatocarpum, 265; probiflorum, 299; *prorepens*, 254; *prostratum*, 277; pseudepidendrum, 299; pudicum, 299; *punctatum*, 349; *pusillum*, 540; pygmaeum, 265; *quinquelobum*, 297; *radicans*, 286, var. *chiriquense*, 286; *Radlkoferianum*, 269; *ramonense*, 261; *ramonianum*, 295; ramosum, 301, var. angustifolium, 301, var. *imbricatum*, 301; *reflexum*, 293; repens, 301; *resectum*, 293; rigidum, 303, var. angustisegmentum, 303; Rousseauae, 267; *ruscifolium*, 206; Sanchoii, 304; *Sancti-Ramoni*, 336; *santaclarense*, 301; Schlecterianum, 304; Schumannianum, 305; sculptum, 306; *serruliferum*, 278; *sessile*, 445; *simulacrum*, 283; spondianum, 267; Stamfordianum, 268; Stangeanum, 268; stenopetalum, 270; strobiliferum, 306; subnutans, 308; *subpatens*, 290; *subulatum*, 488; *subviolascens*, 278; *tenuiflorum*, 276; *teres*, 308; *teretifolium*, 308, var. *Powellianum*, 308; *tessellatum*, 259; tetraceros, 309; trachythece, 309; triangulabium, 310; *tribuloides*, 208; *turialvae*, 293; *umbellatum*, 281; *Umlaufii*, 259; *undulatum*, 522; *utricularioides*, 478; varicosum, 269; *variegatum*, 260; *verecundum*, 306; *viscidum*, 257; volutum, 269; Warszewiczii, 310

Epithecia, 573; *Morrisii*, 574; *panamensis*, 576

Epithecium, 573

Eriopsis, 377; rutidobulbon, 378

Erythrodes, 160; Killipii, 160

Eucnemis, 352

Eulophia, 347; alta, 347; *longifolia*, 347; *Woodfordii*, 347

Euthonaea, 245; *imbricata*, 245; *oppositifolia*, 245

Evelyna, 128; *aurantiaca*, 130; *capitata*, 120; *hymenophora*, 129

F

Fernandezia, 552, 573; *acuta*, 553; *robusta*, 558

Fregia, 133; *amabilis*, 136

G

Galeandra, 332; *Batemanii*, 332; Baueri, 332; juncea, 335

Galeottia, 417; *grandiflora*, 417

Ghiesbreghtia, 337; *calanthoides*, 339; *mexicana*, 339

Gomphichis, 145; *costaricensis*, 145

Gongora, 395; armeniaca, 396, var. bicornuta, 398; *Boothiana*, 398; *bufonia*, 401; *fulva*, 401; *Jenischii*, 398; *leucochila*, 398; maculata, 398, var. latibasis, 401, var. tricolor, 401; *negrita*, 398; *odoratissima*, 398; *Powellii*, 398; *quadricornis*, 398; *retrorsa*, 398; *Shepherdii*, 398; *superflua*, 398; *truncata* var. *alba*, 398; *unicolor*, 398; *vitellina*, 398

Goodyera guyanensis, 153

Govenia, 352; ciliilabia, 533; liliacea, 353; *Powellii*, 353; *utriculata*, 353

Gyas, 339

Gymnadenia, 117

Gynizodon, 513

Gyrostachys, 152; *aguacatensis*, 153; *costaricensis*, 154; *picta*, 156; *Prasophyllum*, 154

H

Habenaria, 117; alata, 118; avicula, 119; bicornis, 120; heptadactyla, 122; monorrhiza, 119; *patentiloba*, 119; pauciflora, 120; petalodes, 119; *petalodes* var. *micrantha*, 119; repens, 122; *setifera*, 120; *spathacea*, 120; *Warszewiczii*, 119

Helcia, 481

Heterotaxis, 431; *crassifolia*, 445

Hexadesmia, 318; *Acostaei*, 320; *fasciculata*, 320; *Lindeniana*, 320; *micrantha*, 319; *pachybulbon*, 320; *Powellii*, 320

Hexisea, 245; bidentata, 245; *imbricata*, 245; *oppositifolia*, 245

Hormidium, 247; *pseudopygmaeum*, 265

Humboltia, 162

Huntleya, 427, 429; *Burtii*, 429; *cerina*, 427; *marginata*, 424; *meleagris*, 429

INDEX

I

Iantha, 476; *pallidiflora*, 478
Inopsis, 476
Ionopsis, 476; *pallidiflora*, 478; *paniculata*, 478; *tenera*, 478; utricularioides, 478; *zonalis*, 478
Isochilus, 329; *chiriquensis*, 329; *linifolium*, 132; major, 329; *prolifera*, 321

J

Jenmania, 143
Jimensia, 339

K

Kefersteinia, 419; *costaricensis*, 422; *lactea*, 423
Kegelia, 379; *Houtteana*, 380
Kegeliella, 379; Houtteana, 380; Kupperi, 380
Koellensteinia, 415; Kellneriana, 416
Kranzlinella, 191; *platyrachis*, 230

L

Laelia, 314; Lueddemanii, 315; *peduncularis*, 314; *rubescens*, 314
Leiochilus, 546; *retusus*, 548
Leochilus, 546; *cochlearis*, 547; labiatus, 547; *major*, 548; *Powellii*, 548; scriptus, 548
Lepanthes, 187; *abnormis*, 190; chiriquensis, 187; eciliata, 188; elata, 188; eximia, 190; insectiflora, 190; Maxonii, 188; *micrantha*, 187; rotundifolia, 189; turialvae, 189
Leucohyle, 481; *subulata*, 489; *Warscewiczii*, 488
Lichterveldia, 492
Limnorchis, 117
Limodorum altum, 347; *Lankesteri*, 342; *purpureum*, 340; *utriculatum*, 353; *verecundum*, 340
Lindleyella, 408; *picta*, 409
Lindsayella, 133; *amabilis*, 137
Liparis, 243; elata, 243; *eustachys*, 242; *fratrum*, 242; *labiata*, 547; *tipuloides*, 242; *Wendlandii*, 242
Lockhartia, 552; acuta, 553; amoena, 555, var. triangulabia, 556; *chiriquiensis*, 556; *costaricensis*, 555; elegans, 560; *grandibracteata*, 555; *lamellosa*, 558; *Lankesteri*, 556; micrantha, 556; mirabilis, 560; obtusata, 558; obtusifolia, 560; Oerstedii, 558; *pallida*, 553; Pittieri, 559; *robusta*, 558; *triangulabia*, 556; *variabilis*, 559; *verrucosa*, 558
Lophiaris, 514
Luddemania, 381
Lueddemannia, 381
Luedemannia, 381
Lycaste, 410; *aciantha*, 449; *Bradeorum*, 415; brevispatha, 411; Campbellii, 411; *candida*, 411; *Dowiana*, 412; *Filomenoi*, 412; macrophylla, 412; *plana*, 412; Powellii, 413; tricolor, 415

M

Macradenia, 570; Brasavolae, 571
Macrochilus, 513
Macroclinium, 566
Malaxis, 234; blephariglottis, 241; *brachyrrhyncha*, 240; *carpinterae*, 238; *caudata*, 506; *cochleariaefolia*, 235; excavata, 238; fastigiata, 240; *hastilabia*, 238; *ichthiorhynca*, 235; *Lankesteri*, 240; *macrostachya*, 236; majanthemifolia, 235; *montana*, 236; Parthonii, 240, var. denticulata, 241; Pittieri, 236; simillima, 238; Soulei, 236; tipuloides, 242; *uncinata*, 238; *Wendlandii*, 242; *Wercklei*, 241; Woodsonii, 239
Masdevallia, 179; Allenii, 185; *aperta*, 232; attenuata, 180; chontalensis, 182; collina, 180; *diantha*, 182; ecaudata, 182; *Lauchеana*, 180; Livingstoneana, 182; *panamensis*, 182; *platyrachis*, 230; simula, 185; tenuissima, 184
Maxillaria, 431; *Abelei*, 464; *aciantha*, 449; *acutifolia*, 437; alba, 436; Allenii, 436; *Amparoana*, 463; *ampliflora*, 440; *angustifolia*, 467; angustisegmenta, 437; angustissima, 437; arachnitiflora, 438; *aurantiaca*, 468; Biolleyi, 439; *Boothii*, 256; brachybulbon, 439; Bradeorum, 440; *Brenesii*, 463; brevipes, 440; Camaridii, 442; chartacifolia, 443; *chiriquensis*, 467; *concava*, 407; conduplicata, 443; confusa, 444; *costaricensis*, 467; crassifolia, 445; ctenostachya, 446; *ctenostachys*, 446; cucullata, 446; dendrobioides, 447; diuturna, 448; *elongata*, 406; exaltata, 448; *foveata*, 407; Friedrichsthalii, 449; fulgens, 451; *gatunensis*, 445; *Henchmanni*, 467; inaudita, 451; *iridifolia*, 466; *lactea*, 463; *Lankesteri*, 468; *Lindeniana*, 446; longipetiolata, 452; luteo-alba, 454; *luteograndiflora*, 454; *Lyonii*, 467; *Macleei*, 465; *macrophylla*, 412; maleolens, 454; *meleagris*, 446; minor, 455; neglecta, 455; *obscura*, 446; oreocharis, 457; *panamensis*, 467; parvilabia, 458; Pittieri, 458; planicola, 460; Powellii, 461; *pubilabia*, 463; *puncto-striata*, 446; repens, 461; *revoluta*, 467; *rhodosticta*, 449; ringens, 463; *Rousseauae*, 463; rufescens, 464;

sessilis, 445; *stachybiorum*, 407; *stenostele*, 465; *tricolor*, 415; *Turckheimii*, 463; *turialbae*, 449; umbratilis, 464; uncata, 465; vagans, 466; valenzuelana, 466; variabilis, 467; Wercklei, 468
Meliclis, 402
Menadena, 431
Mesospinidium, 491; Warscewiczii, 491
Microstylis, 234; *blephariglottis*, 241; *brachyrrhynchos*, 240; *Brenesii*, 241; *cochlearifolia*, 235; *elegantula*, 235; *excavata*, 238; *fastigiata*, 240; *hastilabia*, 238; *histionantha*, 240; *ichthiorrhyncha*, 235; *majanthemifolia*, 235; *montana*, 236; *Parthonii*, 241, var. *denticulata*, 241; *Pittieri*, 236; *simillima*, 238; *tipuloides*, 242; *Wercklei*, 241
Miltonia, 513; Endresii, 513; Roezlii, 514; *superba*, 513
Monacanthus, 359
Monachanthus, 358
Moorea, 386; *irrorata*, 386
Mormodes, 354; *atro-purpurea*, 356; atropurpureum, 355; *barbatum*, 356; colossus, 355; Hookeri, 356; igneum, 357; *macranthum*, 355; *Powellii*, 355; *Wendlandii*, 355
Myanthus, 358

N

Nanodes, 247; *discolor*, 304
Neippergia, 381; *chrysantha*, 382
Neobartlettia, 143
Neomoorea, 386; irrorata, 386
Neottia acaulis, 156; *glandulosa*, 150; *orchioides*, 158; *picta*, 156; *speciosa*, 157
Nidema Boothii, 256, var. *triandrum*, 264; *ottonis*, 264
Notylia, 566; *angustilancea*, 567; Barkeri, 567; *Bernoulii*, 567; *bipartita*, 567; *Brenesii*, 567; Cordesii, 568; *gracilispica*, 569; *guatemalensis*, 567; *Huegelii*, 567; latilabia, 568; *multiflora*, 567; panamensis, 569; pentachne, 569; *Pittieri*, 567; *tamaulipensis*, 567; *tridachne*, 567; *trisepala*, 567; *turialbae*, 567

O

Oakes-Amesia, 564; cryptantha, 565
Odontoglossum, 492; *Aspasia*, 501; caniniferum, 493; chiriquense, 494; convallarioides, 495; *coronarium*, 494; Egertoni, 495; *grande* var. *pallidum*, 498; *hastilabium*, 493; *Insleayi* var. *macranthum*, 498; Oerstedii, 496; *Powellii*, 498; Schlieperianum, 498; *Warscewiczii*, 498, 513
Oerstedella centradenia, 276; *centropetala*, 276
Olgasis, 514
Oncidium, 514; advena, 546; *altissimum*, 519, var. β, 519, var. *Baueri*, 519; ampliatum, 517, var. majus, 519; ansiferum, 519; Baueri, 519; *Bernoullianum*, 517; *bifrons*, 545; bracteatum, 521; *Brenesii*, 533; *bryolophotum*, 530; Cabagrae, 521; *caesium*, 533; *cardiochilum*, 534; *caniniferum*, 493; carthaginense, 522; *carthaginense* var. Oerstedii, 522, var. Swartzii, 522; *caudatum*, 506; *cerebriferum*, 527; cheirophorum, 524; *chiriquense*, 494; *confusum*, 527; *convolvulaceum*, 528; *coronarium*, 494; crista-galli, 525; *decipiens*, 525; *Dielsianum*, 524; ebrachiatum, 527; ensatum, 527; *ensatum*, 519; *fulgens*, 533; *Geertianum*, 533; *Gireoudianum*, 510; globuliferum, 528; *globuliferum* var. *costaricense*, 528; *graciliforme*, 533; heteranthum, 530; *hieroglyphicum*, 519; *ionops*, 530; *iridifolium*, 525, 540; isthmi, 531; *Klotzschianum*, 533; Kramerianum, 532; *Kramerianum* var. *resplendens*, 532; *kymatoides*, 522; *labiatum*, 547; *lacerum*, 542; *Lankesteri*, 519; *megalous*, 530; *naranjense*, 519; nebulosum, 533; *nodosum*, 532; *obryzatoides*, 533; obryzatum, 533; *obsoletum*, 522; ochmatochilum, 534; Oerstedii, 522, var. *crispiflorum*, 522; onustum, 546; *palmophilum*, 349; panamense, 535; *panduriferum*, 522; panduriforme, 536; *Papilio* var. *Kramerianum*, 532; *papilioniforme*, 532; parviflorum, 536; *peliograma*, 546; *polycladium*, 519; Powellii, 538; pusillum, 540; *Rechingerianum*, 521; *scansor*, 528; *scriptum*, 548; stenotis, 541; stipitatum, 542; *stipitatum* var. *platyonyx*, 542; teres, 544; *undulatum*, 522; *varians*, 533; Warscewiczii, 545; *Wercklei*, 528
Onkeripus, 405, 431
Orchidaceae, 107, 247, 337
Orchis monorrhiza, 119
Ornithidium, 431; *album*, 442; *anceps*, 455; *Biolleyi*, 439; *conduplicatum*, 443; *fulgens*, 451; *neglectum*, 455; *Pittieri*, 458; *Wercklei*, 468
Ornithocephalus, 560; bicornis, 561; cochleariformis, 562; *diceras*, 561; *elephas*, 563; inflexus, 563; *lanuginosus*, 561; *mexicanus*, 563; *Pottsiae*, 563; Powellii, 563; *Tonduzii*, 563; *xiphochilus*, 561
Ornithophora, 548
Osmoglossum, 492; *acuminatum*, 495; *anceps*, 495; *convallarioides*, 495; Egertoni, 495

P

Palmorchis, *143*; Powellii, *144*; trilobulata, *144*
Palumbina, *514*
Panstrepis, *402*
Paphiopedilum, *114*; *caudatum*, *116*; *Hincksianum*; *117*; *longifolium*, *117*
Paphiopedium longifolium, *117*
Papiliopsis, *514*; *nodosus*, *532*
Pelexia, *152*; *congesta*, *160*; *Funckiana*, *158*; *guatemalensis*, *160*; *Pringlei*, *158*
Pentulops, *405*, *431*
Peristeria, *384*; elata, *384*; *Humboldtii*, *382*
Peristera, *384*
Pescatorea, *426*, *427*; cerina, *427*
Phadrosanthus, *514*
Phaedrosanthus ciliaris, *257*
Phragmipedium, *114*; caudatum, *116*; longifolium, *116*
Phragmopedilum, *114*; *Warszewiczianum*, *116*
Physanthera, *478*
Physinga, *247*
Physosiphon, *176*; minutiflorus, *176*
Physurus, *160*
Pilumna, *481*
Pittierella, *472*
Platanthera, *117*
Platyglottis, *327*; coriacea, *327*
Platystele, *191*
Pleurothallis, *191*; *acrisepala*, *210*; *Alexanderae*, *208*; Allenii, *205*; alpina, *212*; antonensis, *199*; *aperta*, *232*; arietina, *199*; aristata, *226*; barbae, *234*; *barboselloides*, *210*; *biflora*, *225*; Blaisdellii, *196*; *Bourgeaui*, *217*; *brevis*, *195*; Brighamii, *210*; Broadwayi, *194*, var. *tricarinata*, *194*; calyptrostele, *225*; *canae*, *229*; cardiochila, *197*; *cerea*, *206*; *chiriquensis*, *218*; cobraeformis, *203*; *coccinea*, *480*; Cogniauxiana, *217*; concaviflora, *202*; crenata, *232*; *cucullata*, *221*; *dichotoma*, *226*; *diuturna*, *231*; *divexa*, *226*; dolichopus, *230*; *dryadum*, *224*; *dubia*, *223*; ellipsophylla, *222*; eumecocaulon, *205*; *falcatiloba*, *229*; *fallax*, *208*; filamentosa, *232*; *Fuegii* var. *echinata*, *226*; fulgens, *211*; gelida, *218*; *geminiflora*, *225*; Ghiesbreghtiana, *229*; glandulosa, *212*; *glomerata*, *206*; gnomonifera, *195*; Grobyi, *224*; *hamata*, *232*; hispida, *209*; homolantha, *201*; *Hunteriana*, *232*; *integrilabia*, *224*; *lamprophylla*, *230*; *Lankesteri*, *223*; lepidota, *217*; *longissima*, *229*; *lyroglossa*, *229*; macrantha, *227*; *mandibularis*, *217*; *marginata*, *224*; *megachlamys*, *228*; muricata, *231*; *myriantha*, *223*; *nemorum*, *201*; *Niederleinii*, *229*; octomeriae, *206*; ovatilabia, *224*; *panamensis*, *224*; *pauciflora*, *227*; *peraltensis*, *196*; *peregrina*, *230*; *periodica*, *210*; perpusilla, *234*; Pfavii, *230*; phyllocardia, *234*; phyllocardioides, *234*; *picta*, *224*; *Pittieri*, *218*; *platyrachis*, *230*; *poasensis*, *230*; *polystachya*, *217*; Powellii, *228*; praegrandis, *222*; pruinosa, *227*; pterocaulis, *214*; pyrosodes, *234*; *racemiflora*, *229*; rhodoglossa, *198*; rotundata, *196*; Rowleei, *221*; ruscifolia, *206*; segoviensis, *229*; simulans, *201*; *sororoa*, *231*; spectabilis, *231*; stenostachya, *223*, var. *Lankesteri*, *223*; subserrata, *233*; trachychlamys, *205*; triangulabia, *198*; tribuloides, *208*; Tuerckheimii, *228*; uncinata, *208*; *valenzuelana*, *466*; velaticaulis, *218*; verecunda, *214*; *vittariifolia*, *212*; vittata, *217*; *Wagneri*, *229*; *Williamsii*, *194*; xanthophthalma, *233*;
Pogonia, *123*; cubensis, *125*; mexicana, *125*; rosea, *123*; *Wagneri*, *125*
Polycycnis, *387*; barbata, *389*; *gratiosa*, *389*
Polystachya, *331*; cerea, *331*; *costaricensis*, *331*; Masayensis, *332*; *minor*, *331*; *panamensis*, *331*; *Powellii*, *331*
Ponera albida, *322*; *amethystina*, *322*; *Behrii*, *322*; *bilineata*, *325*; *mescopsis*, *323*
Ponthieva, *148*; *Brenesii*, *152*; *costaricensis*, *150*; Ephippium, *150*; *glandulosa*, *150*; *guatemalensis*, *150*; maculata, *152*; *oblongifolia*, *150*; racemosa, *150*; *rostrata*, *150*
Prescottia, *146*; oligantha, *146*; *panamensis*, *146*; stachyodes, *147*
Pseudepidendrum spectabile, *299*
Pseuderiopsis, *377*
Psittacoglossum, *431*
Psychopsis, *514*

R

Regnellia, *339*
Restrepia, *191*; *filamentosa*, *232*; *Lansbergii*, *233*; *Powellii*, *233*; *subserrata*, *233*; *Tonduzii*, *233*; *xanthophthalma*, *233*
Rhynchadenia, *570*
Rhynchostele, *546*
Rhynchostelis, *546*
Rodriguezia, *478*; *cochlearis*, *547*; compacta, *479*; *lanceolata*, *480*; secunda, *480*; *secunda* var. *panamensis*, *480*
Rolfea, *143*; *Powellii*, *144*

S

Sarcoglottis, *152*; *Hunteriana*, *156*; *picta*, *156*; *Powellii*, *156*; *Purpusiorum*, *156*

Satyrium orchioides, *158*; *plantagineum*, *157*
Scaphosepalum, *186*; elasmotopus, *186*; *longirepens*, *186*; *panamense*, *182*
Scaphyglottis, *318*; Acostaei, *320*; *albida*, *322*; amethystina, *322*; Behrii, *322*; bilineata, *325*; *brachiata*, *322*; cuneata, *320*; dolichophylla, *327*; *gracilis*, *321*; laevilabia, *321*; Lindeniana, *320*; longicaulis, *321*; mesocopsis, *323*; micrantha, *319* minutiflora, *323*; *pauciflora*, *322*; *Powellii*, *323*; *prolifera*, *320*; tenella, *325*; *unguiculata*, *321*; *Wercklei*, *321*
Schomburgkia, *314*; *Lueddemanii*, *315*
Schweinfurth, Charles, *337*
Selenipedium, *114*; chica, *114*; *longifolium*, *117*
Serapias speciosa, *157*; *flava*, *161*
Serrastylis, *570*
Sievekingia, *378*; suavis, *378*
Sigmatostalix, *548*; abortiva, *549*; *costaricensis*, *551*; guatemalensis, *551*; hymenantha, *551*; *poikilostalix*, *551*; racemifera, *552*
Sobralia, *133*; Allenii, *134*; amabilis, *136*; Bletiae, *136*; Bouchei, *136*; callosa, *137*; decora var. aerata, *140*; *epiphytica*, *142*; *eublepharis*, *137*; Fenzliana, *137*; fragrans, *137*; labiata, *138*; leucoxantha, *138*; Lindleyana, *138*; macrophylla, *143*; panamensis, *140*; *panamensis* var. *albiflos*, *140*; *Powellii*, *138*; Rolfeana, *140*; suaveolens, *142*; valida, *142*; Warscewiczii, *143*
Solenidium Endresii, *491*
Solenipedium, *114*
Spathiger, *247*; *rigidus*, *303*; *strobiliferus*, *306*
Spiranthes, *152*; acaulis, *156*; *aguacatensis*, *153*; *colorata*, *157*; costaricensis, *154*; *epiphytica*, *154*; *Funckiana*, *158*; guyanensis, *153*; *jaliscana*, *158*; navarrensis, *157*; orchioides, *158*; Prasophyllum, *154*; speciosa, *157*; *subpandurata*, *154*; Woodsonii, *155*
Stanhopea, *389*; *amoena*, *394*; *aurea*, *394*; *bucephalus*, *391*; *costaricensis*, *390*; graveolens, *390*; *inodora*, *390*; oculata, *391*, var. *constricta*, *390*; pulla, *392*; *venusta*, *394*; Wardii, *394*; *Warscewicziana*, *390*
Stanhopeastrum, *389*
Stelis, *161*; aemula, *174*; Allenii, *164*; atrorubens, *166*; *barbata*, *165*; *bryophila*, *165*; *cascajalensis*, *169*; *chiriquensis*, *165*; *cinerea*, *165*; collina, *175*; *costaricensis*, *165*; crescentiicola, *169*; *cuspidilabia*, *169*; despectans, *165*; Endresii, *171*; *eximia*, *169*; *flexuosa*, *169*; hymenantha, *169*; inaequalis, *164*; *Isthmii*, *169*; leucopogon, *169*; longipetiolata, *175*; Maxonii, *173*; microchila, *165*; montana, *166*; *nutantiflora*, *165*; panamensis, *173*; *parvibracteata*, *171*; Powellii, *172*; *praemorsa*, *160*; *sarcodantha*, *174*; *seleniglossa*, *160*; Skutchii, *167*; Storkii, *172*; vestita, *174*; Williamsii, *175*
Stenocoryne, *408*
Stenoptera, *145*; *costaricensis*, *145*
Stenorrhynchus, *152*; *jaliscana*, *158*; *navarrensis*, *157*; *orchioides*, *158*; *speciosus*, *157*

T

Telipogon, *571*; dendriticus, *572*; radiatus, *572*
Telopogon, *571*
Tetragamestus gracilis, *320*
Thelypogon, *571*
Thiebautia, *339*
Thorvaldsenia, *343*
Todaroa, *578*
Tolumnia, *514*
Trichocentrum, *475*; panamense, *476*
Trichophila, *481*
Trichopilia, *481*; *coccinea*, *486*; *crispa*, *486*; *hymenantha*, *489*; *jamaicensis*, *489*; *Kienastiana*, *488*; *lepida*, *486*; leucoxantha, *482*; maculata, *484*; marginata, *486*, var. *alba*, *486*, var. *lepida*, *486*, var. *olivacea*, *488*; *Powellii*, *484*; suavis, *488*; subulata, *488*; turialbae, *490*
Tridachne, *566*; *virens*, *567*
Trigonidium, *469*; Egertonianum, *469*; Lankesteri, *471*; obtusum, *471*; *Seemanni*, *469*
Triphora, *123*; *cubensis*, *125*; *mexicana*, *125*; *Wagneri*, *125*
Trixeuxis, *480*
Trizeuxis, *480*; *andina*, *481*; falcata, *481*
Trophianthus, *499*
Tylochilus, *349*

V

Vanilla, *126*; *fragrans*, *126*; *Pittieri*, *128*; planifolia, *126*; pompona, *128*

W

Waluewa, *546*
Warczewiczella, *419*
Warrea, *351*; costaricensis, *352*; *discolor*, *423*; *graveolens*, *416*; *marginata*, *424*; *quadrata*, *424*
Warscewiczella, *419*; *aromatica*, *421*; *calloglossa*, *421*; *discolor*, *423*; *Wendlandii*, *421*; *velata*, *424*

Warszewiczella, *419*; *marginata*, *424*
Warscewitzia, *359*
Williams, Louis O., *107*, *247*, *337*

X

Xaritonia, *514*
Xeilyathum, *514*
Xylobium, *405*; *concavum*, *407*; elongatum, *406*; *Filomenoi*, *407*; foveatum, *407*; Powellii, *407*; *stachybiorum*, *407*; *sublobatum*, *407*

Z

Zygopetalon, *417*
Zygopetalum, *417*, *427*; *aromaticum*, *421*; *Burtii*, *429*; *cerinum*, *427*; *discolor*, *423*; grandiflorum, *417*; *lacteum*, *423*; *meleagris*, *429*; parviflorum, *419*; *quadratum*, *424*; *Wendlandii*, *421*
Zygostates costaricensis, *561*

CHECKLIST OF THE ORCHIDS OF PANAMA

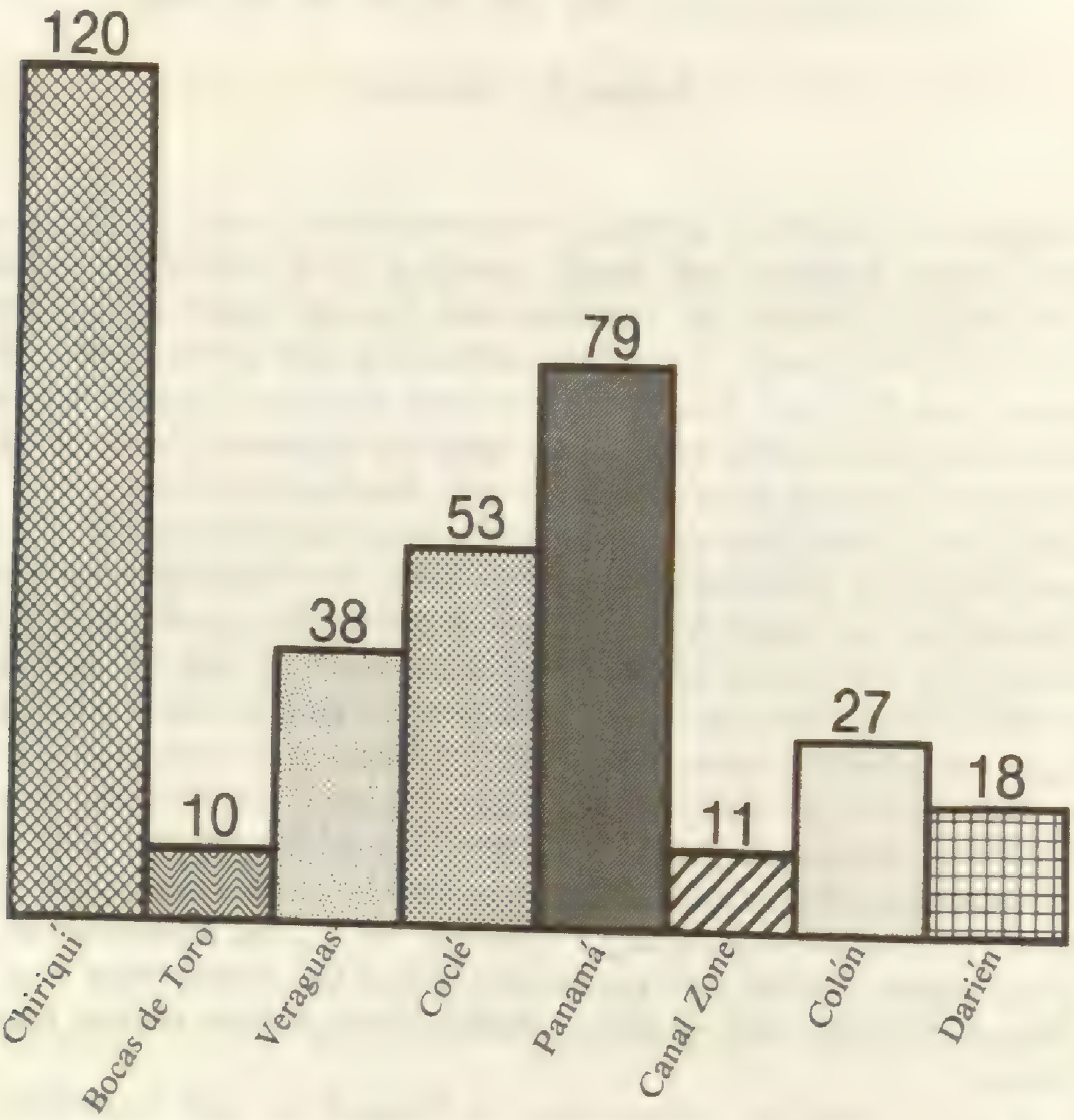
Robert L. Dressler

The Isthmus of Panama is unusual in biogeographic terms. It is now a bridge between Central America and South America. It is reasonably certain that before becoming a bridge, the isthmian area was, at times, an archipelago of steep, mountainous islands. The area combines a rich native biota with immigrants from both the east, South America, and the west, Central America. The mountains and wetter areas of Panama, with the adjacent Chocó of Colombia, are perhaps the richest floristic area in the American tropics.

The fascicles of the *Flora of Panama* that treat the Orchidaceae were out of print soon after their publication in the late 1940s, and these have been treasures eagerly sought by orchidists for a number of years. This reprinting of the orchid fascicles is most welcome to all of us who are concerned with the orchid flora of Panama and Central America. There have been, of course, many amateur orchid growers in the isthmian area, and some of these have spent much time and energy collecting and growing native orchids. All too often, though, there was no local botanist interested in the orchids, and little of the material ever found its way into herbaria. One person, however, stands out for his contributions to orchid study in Panama. Mr. Henry P. Butcher has a great knowledge of Panama and of Panamanian orchids and gesneriads. Butch has added many new records to the flora of Panama, and he always stands ready to help visiting botanists or plant lovers.

Many of the floristically richest areas in Panama are still accessible only by helicopter or by strenuous hiking. Others have become easily accessible only within the last twenty years. Thus, the material available to Williams and Allen in the 1940's was only a small sample of the Panamanian orchid flora. Even now, we are still finding novelties in such classical localities as the hills north of El Valle de Antón. In more remote areas we expect to find several novelties in each day of field work. I have prepared a checklist with additions and changes to the *Flora of Panama*, which is appended to this reprint. Since the publication of the orchid fascicles of the *Flora of Panama*, about 300 additional orchid species have been recorded for Panama, bringing the known orchid flora up to nearly 800 species. There are also perhaps one hundred species which have been collected, but are not yet identified or described. I would guess that the flora of Panama will include between 1000 and 1200 orchid species.

It is interesting to tabulate the additions to the orchid flora of Panama since the publication of the orchid fascicles by Williams and Allen. These are summarized by province in the graph below. A single species may be tabulated from more than two provinces, and the left-to-right arrangement of the provinces on the graph is from west (north) to east (south). From this tabulation it is evident that: (1) Chiriquí province is exceedingly rich in orchid species, and still not well sampled. (2) The former Canal Zone, with no mountains high enough to develop cloud forest, is well sampled and rather poor in orchids. (3) The remaining provinces score not so much according to their floristic richness as their proximity to and accessibility from the city of Panama.



The Checklist

I must emphasize that this checklist is a collation from the *Flora* and from card files that I have tried to keep current during the last few years. I may have overlooked some collections or some additions that have been reported in the literature, and too, there is much material on hand which cannot be identified using the resources available on the isthmus. Thus, this is by no means a complete list of the orchids of Panama.

I have indicated additions by an asterisk (*) immediately after the name of the species. The author and literature citations following the names are to the place where the names were first published, not necessarily where the species were first reported from Panama.

Nomenclatural changes are indicated by the following abbreviations:

(sensu)—in the sense of.

(syn)—names which I consider to be taxonomic or homotypic synonyms.

(in syn)—treated as synonyms in the *Flora of Panama* but here considered distinct taxa. Entries with this notation are therefore additions to the number of species present in the *Flora*.

In the checklist, names in roman type are accepted as correct for Panamanian species. Names in *italic* are not accepted for one reason or another. They are followed by the correct name for the taxon or reference to more information elsewhere in the checklist.

To save space, I use the following additional abbreviations:

FP—Orchidaceae *in* R. E. Woodson, Jr., R. W. Schery and Collaborators. Flora of Panama. Ann. Missouri Bot. Gard. 33: 1–140, 315–404. 1946; 36: 1–132, 133–245. 1949.—This reprint.

VOI—G. C. K. Dunsterville & L. A. Garay. Venezuelan Orchids Illustrated. 6 Vols. A. Deutsch. London. 1959–1976.

Where possible I indicate the provinces in which additions to the *Flora* have been found.

The early fascicles of the *Flora of Panama* used double pagination. As the orchid fascicles appeared in two different volumes of the ANNALS of the Missouri Botanical Garden, this checklist uses the *Flora of Panama* pagination—those numbers in *italic* in parentheses at the bottoms of pages.

Acineta chrysantha 382
A. sella-turcicia* Reichb. f., Bot. Zeit. 10: 705. 1852.—Cited for Panama in VOI 5: 20. 1972, though this may refer to material treated as *A. superba* in FP.
A. superba (See also A. sella-turcicia) 382
Acostaea costaricensis 191
A. pleurothalloides* Schltr., Rep. Sp. Nov. Beih. 19: 285. 1923.—Cited for Panamá province by Luer (Selbyana 1: 214. 1975).
Ada allenii (L. O. Wms. ex Schweinf.) N. H. Wms., Brittonia 24: 104. 1972.—FP(syn): *Brassia allenii*..... 506
A. chlorops (Endres & Reichb. f.) N. H. Wms., Brittonia 24: 104. 1972.—FP(syn): *Brassia chlorops*. 509
Aspasia—see also *Cischweinfia.*
A. epidendroides 501
A. epidendroides var. *principissa* = A. principissa 501
A. principissa* Reichb. f., Bot. Zeit. 10: 637. 1852.—FP(syn): *A. epidendroides* var. *principissa;* see Williams (Brittonia 26: 342. 1975) 501
A. pusilla = Cischweinfia pusilla 503
Aspidogyne stictophylla* (Schltr.) Garay, Bradea 2: 204. 1977.—Veraguas.
Barbosella circinata* Luer, Selbyana 3: 204. 1977.—Chiriquí.
B. orbicularis* Luer, Selbyana 3: 10. 1976.—Panamá.
Barkeria chinensis* (Lindl.) Thien, Taxon 15: 241. 1966.—Chiriquí.
Baskervilla colombiana* Garay, Svensk Bot. Tidsk. 47: 196. 1953.—Chiriquí, Panamá, Veraguas.
Beloglottis costaricensis (Reichb. f.) Schltr., Beih. Bot. Centralbl. 37(2): 365. 1920.—FP(syn): *Spiranthes costaricensis*. 154
Bifrenaria—see *Rudolfiella.*
B. picta = Rudolfiella picta 409
Bletia campanulata Llave & Lex., Nov. Veg. Descr. Orch. Opusc. 17. 1825.—FP(sensu): *B. reflexa;* see Dressler (Brittonia 20: 185–188. 1968)..... 342
B. purpurea 340
B. reflexa sensu FP. See B. campanulata 342
Bothriochilus—see *Coelia.*
B. macrostachya = Coelia macrostachya 330
Brachionidium pusillum* Ames & Schweinf., Sched. Orch. 10: 52. 1930.—Chiriquí, Veraguas.
B. valerioi* Ames & Schweinf., Sched. Orch. 10: 53. 1930.—Chiriquí, Veraguas.
Brachystele guyanensis (Lindl.) Schltr., Beih. Bot. Centralbl. 36(2): 373. 1920.—FP(syn): *Spiranthes guyanensis* 153

318
Brassavola acaulis 316
B. nodosa .....
Brassia—see also *Ada*.
506
B. allenii = Ada allenii .....
B. arcuigera Reichb. f., Gard. Chron. 1869: 388. 1869.—FP(syn): *B.*
511
longissima. .....
506
B. caudata .....
509
B. chlorops = Ada chlorops .....
510
B. gireoudiana .....
B. lanceana* Lindl., Bot. Reg. 21: *t. 1754*. 1835.—Cited for Panama in VOI 4:
38. 1966.
511
B. longissima = B. arcuigera .....
345
Bulbophyllum aristatum .....
345
B. pachyrrhachis .....
B. wagneri* Schltr., Rep. Sp. Nov. 17: 142. 1921.—Omitted from FP, though
based on Panamanian material.

339
Calanthe calanthoides (Rich. & Gal.) Hamer & Garay in Hamer, Las Orquí-
deas de El Salvador 90. 1974.—FP(syn): *C. mexicana*. .....
339
579
C. mexicana = C. calanthoides .....
579
Campylocentrum brenesii .....
C. micranthum .....
C. pachyrrhizum* (Reichb. f.) Rolfe, Orchid Rev. 11: 246. 1903.—Canal Zone,
Panamá.
C. poeppigii* (Reichb. f.) Rolfe, Orchid Rev. 11: 246. 1903.—Canal Zone.
C. tyrridion* Garay & Dunsterv., VOI 2: 54. 1961.—Canal Zone.
360
Catasetum—see also *Clowesia, Dressleria*.
362
C. bicolor .....
C. *eburneum* sensu FP. See Dressleria suavis .....
363
C. maculatum H.B.K., Syn. Pl. Aequinoct. 1: 331. 1822.—FP(syn): *C.*
363
oerstedii. .....
365
C. oerstedii = C. maculata .....
365
C. suave sensu FP. See Dressleria dilecta .....
367
C. viridiflavum .....
C. *warczewitzii* = Clowesia warczewitzii .....
Cattleya dowiana* Batem., Gard. Chron. 1866: 922. 1886.—Darién.
313
C. patinii Cogn., Dict. Icon. Orch. *t. 25*. 1900.—FP(syn): *C. skinneri* var.
313
autumnalis. .....
C. skinneri var. *autumnalis* = C. patinii .....
312
Caularthron bilamellatum (Reichb. f.) R. E. Schultes, Bot. Mus. Leafl. 18: 92.
1958.—FP(syn): *Diacrium bilamellatum*. .....
Chaubardiella chasmatochila* (Fowlie) Garay, Orquideología 4: 148. 1969.—
Panamá.
421
Chondrorhyncha—see also *Cochleanthes, Kefersteinia*.
C. aromatica = Cochleanthes aromatica .....
421
C. bicolor* Rolfe, Kew Bull. 1898: 393.—Chiriquí, Coclé, Veraguas.
422
C. caloglossa = Cochleanthes picta .....
423
C. costaricensis = Kefersteinia costaricensis .....
422
C. discolor = Cochleanthes discolor .....
424
C. lactea = Kefersteinia lactea .....
C. *marginata* sensu FP. See Cochleanthes lipscombiae .....
343
C. reichenbachiana* Schltr., Rep. Sp. Nov. 17: 15. 1921.—Coclé, Darién.
Chysis aurea .....

Cischweinfia dasyandra* (Reichb. f.) Dressler & N. H. Wms., Amer. Orchid Soc. Bull. 39: 991. 1970.—Chiriquí, Panamá.
C. pusilla (C. Schweinf.) Dressler & N. H. Wms., Amer. Orchid Soc. Bull. 39: 992. 1970.—Chiriquí, Coclé, Darién.—FP(syn): *Aspasia pusilla*. *503*
Cleistes rosea Lindl., Gen. Sp. Orch. Pl. 410. 1840.—FP(syn): *Pogonia rosea*. ... *123*
Clowesia rosea* Lindl., Bot. Reg. 29: misc. 25. 1843.—Cited for Panama by Williams (Ceiba 5: 175. 1956), though its occurrence outside of Mexico is somewhat doubtful.
C. russelliana* (Hook.) Dodson, Selbyana 1: 136. 1975.—Cited for Panama by Williams (Ceiba 5: 175. 1956).
C. warczewitzii (Lindl. & Paxt.) Dodson, Selbyana 1: 136. 1975.—FP(syn): *Castasetum warczewitzii*. *367*
Cochleanthes aromatica (Reichb. f.) Schultes & Garay, Bot. Mus. Leafl. 28: 323. 1954.—FP(syn): *Chondrorhyncha aromatica*. *421*
C. discolor (Lindl.) R. E. Schultes & Garay, Bot. Mus. Leafl. 28: 324. 1954.—FP(syn): *Chondrorhyncha discolor*. *423*
C. lipscombiae (Rolfe) Garay, Orquideología 4: 152. 1969.—FP(sensu): *Chondrorhyncha marginata* *424*
C. picta (Reichb. f.) Garay, Bot. Mus. Leafl. 21: 256. 1967.—FP(syn): *Chondrorhyncha caloglossa*. *421*
Coelia macrostachya Lindl., Benth. Pl. Hartw. 92. 1842.—FP(syn): *Bothriochilus macrostachya*. *330*
Coeliopsis hyacinthosma *377*
Comparettia falcata* Poepp. & Endl., Nov. Gen. Sp. 1: 42. 1836.—Chiriquí.
Coryanthes maculata *403*
C. speciosa* (Hook.) Hook., Bot. Mag. 58: sub *t. 3102*. 1831.—Canal Zone.
Corymborkis flava *161*
Cranichis diphylla* Sw., Nov. Gen. Sp. Prodr. 120. 1788.—Cited for Panama in VOI 5: 58. 1972.
C. muscosa *148*
Cryptarrhena guatemalensis* Schltr., Rep. Sp. Nov. 10: 253. 1911.—Panamá.
C. lunata* R. Br., Bot. Reg. 2: *t. 153*. 1816.—Cited for Panama in VOI 3: 68. 1965.
Cryptocentrum calcaratum* (Schltr.) Schltr., Rep. Sp. Nov. 12: 214. 1913.—Cited for Panama by Williams (Ceiba 5: 211. 1956).
C. gracilipes *473*
C. gracillimum* Ames & Schweinf., Sched. Orch. 8: 68. 1925.—Cited for Panama by Williams (Ceiba 5: 211. 1956).
C. inaequisepalum *473*
C. latifolium *474*
C. standleyi *475*
Cryptophoranthus lepidotus *178*
C. pleurothallopsis* Kränzlin, Kew Bull. 1925: 115. Darién.
Cyclopogon prasophyllum (Reichb. f.) Schltr., Beih. Bot. Centralbl. 37(2): 393. 1920.—FP(syn): *Spiranthes prasophylla*. *154*
Cycnoches aureum *369*
C. chlorochilon *370*
C. dianae *372*
C. egertonianum—This complex needs revision. There are at least three species in this complex in Panama, none of them being the typical *C. egertonianum*. The three following names, all listed as synonyms of *C. egertonianum* in FP, are based on Panamanian material.
C. guttulatum* Schltr., Rep. Sp. Nov. Beih. 17: 56. 1922. FP(in syn): *C. egertonianum* (See also C. egertonianum.) *373*

C. pachydactylum* Schltr., Rep. Sp. Nov. Beih. 17: 57. 1922. FP(in syn): *C. egertonianum* (See also C. egertonianum.) 373
C. stenodactylon* Schltr., Rep. Sp. Nov. Beih. 17: 59. 1922. FP(in syn): *C. egertonianum* (See also C. egertonianum.) 373
C. tontuzii = C. ventricosum 376
C. ventricosum (incl. *C. tonduzii*) 376
C. punctatum 349

Diacrium—see *Caularthron*.
D. bilamellatum = Caularthron bilamellatum 312
Dichaea brachypoda* Reichb. f., Beitr. Orch. Cent.-Amer. 78. 1866.—Panamá.
D. ciliolata = D. hystricina 574
D. costaricensis* Schltr., Rep. Sp. Nov. Beih. 19: 73. 1923.—Chiriquí.
D. dammeriana* Kränzlin, Pflanzenreich 83: 41. 1923.—Chiriquí.
D. hystricina Reichb. f., Flora 48: 279. 1865.—FP(syn): *D. ciliolata* 574
D. lobata* (Ames & Correll) L. O. Wms., Ceiba 1: 189. 1950.—Chiriquí.
D. morrisii 574
D. muricata 575
D. panamensis 576
D. powellii = D. trulla 578
D. trulla Reichb. f., Beitr. Orch. Centr.-Amer. 104. 1866.—FP(syn): *D. powellii*. 578
D. tuerckheimii* Schltr. Orchis 10: 188. 1916.—Panamá.
Dimerandra emarginata (G. F. W. Mey.) Hoehne, Bol. Agric. (São Paulo) 34: 618. 1934.—FP(syn): *Epidendrum stenopetalum*. 270
Dracula erythrochaete* (Reichb. f.) Luer, Selbyana 2: 195. 1978.—Chiriquí.
D. pusilla* (Rolfe) Luer, Selbyana 2: 196. 1978.—Chiriquí.
Dresslerella elvallensis* Luer, Selbyana 3: 2. 1976.—Coclé.
D. hispida (L. O. Wms.) Luer, Selbyana 3: 4. 1976.—FP(syn): *Pleurothallis hispida*. 209
D. pertusa* (Dressler) Luer, Selbyana 3: 6. 1976.—Panamá.
D. powellii* (Ames) Luer, Selbyana 3: 8. 1976.
Dressleria helleri* Dodson, Selbyana 1: 132. 1975.—Panamá.
D. dilecta (Reichb. f.) Dodson, Selbyana 1: 132. 1975.—FP(sensu): *Catasetum suave*. 365
D. suavis (Ames & Schweinf.) Dodson, Selbyana 1: 132. 1975.—FP(sensu): *Catasetum eburneum*. 362
Dryadella linearifolia* (Ames) Luer, Selbyana 2: 208. 1978.—Panamá.
D. pusiola* (Reichb. f.) Luer, Selbyana 2: 209. 1978.—Panamá.
D. simula (Reichb. f.) Luer, Selbyana 2: 209. 1978..—FP(syn): *Masdevallia simula*. 185

Elleanthus aurantiacus 130
E. capitatus—Garay has revised *Elleanthus* section *Cephalelyna* (Bot. Mus. Leafl. 26: 7–12. 1978) and probably would refer the Panamanian material to some other species, possibly *E. cynanocephalus* (Reichb. f.) Reichb. f. 129
E. curtii* Schltr., Rep. Sp. Nov. Beih. 19: 79. 1923.—Cited for Panama by Garay (Flora of Ecuador 9: 76. 1978). 129
E. cyanocephalus. See Elleanthus capitatus 129
E. hymenophorus 129
E. jimenezii* (Schltr.) C. Schweinf., Bot. Mus. Leafl. 5. 38. 1937.—Coclé.

E. lancifolium Presl., Rel. Haenk. 97. 1827.—FP(syn): *E. laxus* (fide Garay, Caldasia 10: 232. 1968). *132*
E. laxus = E. lancifolium *132*
E. longibracteatus (Lindl. ex Griseb.) Fawc., Prov. List Pl. Jamaica 38. 1893.—FP(syn): *E. trilobatus* (fide Garay, Orquideología 5: 173. 1970). *130*
E. linifolius *132*
E. muscicola *133*
E. trilobatus = E. longibracteatus *130*
Encyclia abbreviata (Schltr.) Dressler, Brittonia 13: 264. 1961.—FP(syn): *Epidendrum abbreviatum*. *254*
E. amanda* (Ames) Dressler, Phytologia 21: 440. 1971.—FP(in syn): *Epidendrum oncidioides* var. *gravidum*. *262*
E. brassavolae (Reichb. f.) Dressler, Brittonia 13: 264. 1961.—FP(syn): *Epidendrum brassavolae*. *256*
E. campylostalix (Reichb. f.) Schltr., Rep. Sp. Nov. Beih. 17: 45. 1922.—FP(syn): *Epidendrum campylostalix*. *256*
E. ceratistes (Lindl.) Schltr., Rep. Sp. Nov. Beih. 17: 45. 1922.—FP(syn): *Epidendrum oncidioides* var. *ramonense*. *261*
E. chacaoensis (Reichb. f.) Dressler & Pollard, Phytologia 21: 436. 1971.—FP (syn): *Epidendrum ionophlebium*. *261*
E. chimborazoensis* (Schltr.) Dressler, Phytologia 21: 240.—Coclé, Colón, Panamá.
E. cochleata (L.) Lemée, Fl. Guyane Française 1: 418. 1955.—FP(syn): *Epidendrum cochleatum*. *259*
E. cordigera (H. B. K.) Dressler, Taxon 13: 247. 1964.—FP(sensu): *Epidendrum atropurpureum*. *255*
E. gravida (Lindl.) Schltr., Beih. Bot. Centralbl. 36(2): 472. 1918.—FP(syn): *Epidendrum oncidioides* var. *gravidum*. *262*
E. livida (Lindl.) Dressler, Brittonia 13: 265. 1961.—FP(syn): *Epidendrum condylochilum*. *259*
E. mooreana (Rolfe) Schltr., Die Orchideen 210. 1914.—FP(syn): *Epidendrum oncidioides* var. *mooreanum*. *262*
E. prismatocarpa (Reichb. f.) Dressler, Brittonia 13: 265. 1961.—FP(syn): *Epidendrum prismatocarpum*. *265*
E. pseudopygmaea* (Finet) Dressler & Pollard, Orquídea (Méx.) 3: 310. 1974.—Cited for Panama by Hamer, Las Orquídeas de El Salvador 1: 242. 1974
E. pygmaea (Hook.) Dressler, Brittonia 13: 265. 1961.—FP(syn): *Epidendrum pygmaeum*. *265*
E. sima* Dressler, Orquideología 4: 91. 1969.—Coclé, Panamá.
E. spondiada (Reichb. f.) Dressler, Phytologia 21: 441. 1971.—FP(syn): *Epidendrum spondiadum* *267*
E. varicosa (Batem.) Schltr., Beih. Bot. Centralbl. 36(2): 474. 1918.—FP(syn): *Epidendrum varicosum* *269*
E. vespa (Vell.) Dressler, Phytologia 21: 441. 1971.—FP(syn): *Epidendrum crassilabium*. *260*
Epidanthus muscicola* (Schltr.) L. O. Wms., Bot. Mus. Leafl. 8: 151. 1940.—Chiriquí.
E. paranthicus *336*
Epidendrum—see also *Encyclia, Dimerandra, Nidema.*
E. abbreviatum = Encyclia abbreviata *254*

E. acunae* Dressler, Amer. Orchid Soc. Bull. 28: 358. 1959.—FP(sensu): *Epidendrum ramosum* var. *angustifolium*. 301
E. alfaroi* Ames & Schweinf., Sched. Orch. 10: 55. 1930.—Chiriquí.
E. allenii 270
E. anceps 273
E. anoglossum* Schltr., Rep. Sp. Nov. 9: 214. 1911.—Chiriquí.
E. atropurpureum sensu FP. See Encyclia cordigera 255
E. baumannianum* Schltr., Rep. Sp. Nov. Beih. 7. 126. 1920.—Bocas del Toro, Coclé, Colón, Panamá.
E. bisulcatum 273
E. boothii = Nidema boothii 255
E. brassavolae = Encyclia brassavolae 256
E. caligarium 275
E. campylostalix = Encyclia campylostalix 256
E. carolii 276
E. centradenia 276
E. centropetalum 276
E. ciliare 257
E. ciliare var. *oerstedii* = E. oerstedii 259
E. cocleense 277
E. concavilabium* C. Schweinf., Bot. Mus. Leafl. 4: 118. 1937.—Panamá 259
E. cochleatum = Encyclia cochleata 259
E. condylochilum = Encyclia livida 277
E. confertum 278
E. congestum 278
E. coriifolium (See also E. fuscopurpureum.) 290
E. coronatum Ruiz & Pavón, Syst. Veg. 1: 242. 1798.—FP(syn): *E. moyobambae*. 260
E. crassilabium = Encyclia vespa 279
E. criniferum 279
E. cristatum* Ruiz & Pavón, Syst. Veg. 1: 243. 1798.—Coclé. 279
E. cryptanthum 279
E. dentiferum 281
E. dentilobum 281
E. difforme 283
E. dunnii* A. D. Hawkes, Orchid Jour. 1: 39. 1952.—Coclé. 284
E. eburneum 284
E. ellipsophyllum 285
E. endresii—Williams considered the FP record for this species to be an error (Ceiba 5: 120. 1956), but the species does occur in Chiriquí 285
E. equitantifolium = Jacquiniella equitantifolia 285
E. exasperatum 286
E. exile* Ames, Sched. Orch. 10: 63. 1930.—Chiriquí.
E. flexuosissimum* C. Schweinf., Bot. Mus. Leafl. 14: 55. 1949.—Coclé, Panamá.
E. fuscopurpureum* Schltr., Rep. Sp. Nov. Beih. 17: 32. 1922.—FP(syn): *E. coriifolium*. 286
E. hellerianum* A. D. Hawkes, Orchid Digest 30: 258. 1966.—Colón, Panamá. 286
E. hunterianum 287
E. ibaguense sensu FP. See E. radicans 287
E. imatophyllum 287
E. incomptum 288
E. intermixtum* Ames & Schweinf., Sched. Orch. 10: 65. 1930.—Chiriquí, Veraguas.

E. ionophlebium = Encyclia chacaoensis *261*
E. isomerum *289*
E. lacteum* Dressler, Orquideología 11: 108. 1976.—Veraguas.
E. lancilabium* Schltr., Rep. Sp. Nov. Beih. 19: 38. 1923.—Chiriquí.
E. latifolium* (Lindl.) Garay & Sweet, Jour. Arnold Arbor. 53: 392. 1972.—Coclé.
E. laucheanum* Rolfe, Kew Bull. 1893: 62.—Chiriquí.
E. lockhartioides *289*
E. microdendron *289*
E. microphyllum* Lindl., Jour. Bot. (Hooker) 3: 83. 1841.—Darién.
E. miserrimum* Reichb. f., Bonplandia 3: 220. 1855.—Coclé, Veraguas.
E. moyobambe = E. coronatum *290*
E. nocturnum *291*
E. obesum *292*
E. obliquifolium* Ames, Hubb. & Schweinf., Bot. Mus. Leafl. 3: 73. 1935.—Chiriquí.
E. oerstedii* Reichb. f., Bot. Zeit. 10: 937. 1852.—FP(syn): *E. ciliare* var. *oerstedii* *259*
E. oncidioides var. *gravidum* = E. gravida. See also Encyclia amanda *262*
E. oncidioides var. *mooreanum* = Encyclia mooreana *262*
E. oncidioides var. *ramonense* = Encyclia ceratistes *261*
E. ottonis = Nidema ottonis *264*
E. pajitense* C. Schweinf., Bot. Mus. Leafl. 14: 56. 1949.—Coclé.
E. panamense *292*
E. paniculatum *293*
E. parkinsonianum *264*
E. pendens *294*
E. peperomia Reichb. f., Bonplandia 2: 20. 1854.—FP(syn): *E. porpax* *298*
E. phyllocharis* Reichb. f., Xenia Orch. 3: 11. 1878.—Chiriquí, Coclé.
E. physodes *295*
E. pinniferum* C. Schweinf., Bot. Mus. Leafl. 5: 92. 1938.—Chiriquí.
E. platystigma *295*
E. polyanthum *297*
E. porpax = E. peperomia *298*
E. powellii *298*
E. prismatocarpum = Encyclia prismatocarpa *265*
E. probiflorum *299*
E. pseudepidendrum *299*
E. pudicum *299*
E. pumilum* Rolfe, Kew Bull. 1893: 171. 1893.—Chiriquí.
E. pygmaeum = Encyclia pygmaea *265*
E. radicans Pavón ex Lindl., Gen. Sp. Orch. Pl. 104. 1831.—FP(sensu): *E. ibaguense*. *286*
E. ramosum *301*
E. ramosum var. *angustifolium* sensu FP. See E. acunae *301*
E. repens *301*
E. rigidum *303*
E. rousseauae *267*
E. rugosum* Ames, Sched. Orch. 6: 74. 1923.—Chiriquí.
E. sanchoi *304*
E. schlechterianum *304*
E. schumannianum *305*
E. sculptum *306*
E. selaginella* Schltr., Rep. Sp. Nov. 3: 48. 1906.—Chiriquí

E. smaragdinum* Lindl., Bot. Reg. 24: misc. 32. 1838.—Colón.
E. spondiadum = Encyclia spondiada 267
E. stamfordianum 268
E. stangeanum 268
E. stenopetalum = Dimerandra emarginata 270
E. strobiliferum 306
E. subnutans 308
E. teretifolium = Jacquiniella teretifolia 308
E. tetraceros 309
E. trachythece 309
E. triangulabium 310
E. varicosum = Encyclia varicosa 269
E. vincentinum* Lindl., Jour. Bot. (Hooker) 3: 88. 1840.—Darién.
E. volutum 269
E. wallisii* Reichb. f., Gard. Chron. n.s. 4: 66. 1875.—Coclé. Panamá.
E. warszewiczii 310
E. wercklei* Schltr., Rep. Sp. Nov. 3: 48. 1906.—Chiriquí.
Eriopsis biloba Lindl., Bot. Reg. 33: sub. *t.* 9. 1847.—FP(syn): *E. rutidobulbon* 378
E. rutidobulbon = E. biloba 378
Erythrodes killipii 160
E. vesicifera* (Reichb. f.) Ames, Orchidaceae 7: 78. 1922.—Coclé.
Eulophia alta 347
Eurystyles cotyledon* Wawra, Österr. Bot. Zeitschr. 13: 233. 1863.—Chiriquí.

Galeandra baueri 332
G. beyrichii* Reichb. f., Linnaea 24: 854. 1849.—Cited for Coclé province by Allen (Orchid Jour. 2: 215. 1953).
G. juncea = G. styllomisantha 335
G. styllomisantha (Vell.) Hoehne, Arq. Bot. Estado São Paulo. n.s., f.m. 2: 146. 1952.—FP(syn): *G. juncea*. 335
Gongora armeniaca 396
G. armeniaca var. *bicornuta* = G. horichiana 398
G. gibba* Dressler, Orquideología 7: 72. 1972.—Coclé, Colón.
G. horichiana* Fowlie, Orchid Digest 29: 247. 1965.—FP(syn): *G. armeniaca* var. *bicornuta*. 398
G. maculata = G. quinquenervis 398
G. maculata var. *latibasis* = G. tricolor 401
G. maculata var. *tricolor* = G. tricolor 401
G. quinquenervis Ruiz & Pavón, Syst. Veg. 227. 1798.—FP(syn): *G. maculata* 398
G. tricolor* (Lindl.) Reichb. f., Bonplandia 2: 93. 1854.—FP(syn): *G. maculata* var. *tricolor*, var. *latibasis*. 401
Govenia ciliilabia 353
G. liliacea 353

Habenaria alata 118
H. avicula 119
H. bicornis 120
H. clypeata* Lindl., Gen. Sp. Orch. Pl. 311. 1835.—Chiriquí
H. entomantha* (Llave & Lex.) Lindl., Gen. Sp. Orch. Pl. 311. 1835.—Chiriquí. 122
H. heptadactyla = H. leprieuri 122
H. leprieuri Reichb. f., Linnaea 19: 376. 1846.—FP(syn): *H. heptadactyla*. 122
H. mesodactyla* Griseb., Fl. Brit. W. Indies 664. 1864.—Panamá.

H. monorrhiza *119*
H. pauciflora = H. trifida *120*
H. petalodes *119*
H. repens *122*
H. trifida H.B.K., Nov. Gen. Sp. 1: 330. 1815.—FP(syn): *H. pauciflora*. *120*
Helleriella nicaraguensis* Hawkes, Phytologia 14: 4. 1966.—Chiriquí.
Hexisea—for key to species, see Orquídea (Méx.) 7: 225. 1979.
H. arctata* Dressler, Orquídea (Méx.) 7: 223. 1979.—Chiriquí, Veraguas.
H. bidentata (See also H. imbricata) *245*
H. imbricata* (Lindl.) Reichb. f., Ann. Bot. Syst. 6: 470. 1862.—FP(in syn): *H. bidentata*. *245*
H. sigmoidea* Ames & Schweinf., Sched. Orch. 8: 39. 1925.—Chiriquí.
Homalopetalum pumilio* (Reichb. f.) Schltr., Rep. Sp. Nov. Beih. 19: 48. 1923.—Chiriquí.
Houlletia odoratissima* Linden ex Lindl. & Paxt., Paxton's Fl. Gard. 3: 172. 1853.—Panamá.
H. tigrina* Linden ex Lindl. & Paxt., Paxton's Fl. Gard. 3: 171. 1853.—Coclé, Darién, Panamá.
Huntleya burtii Endres & Reichb. f., Gard. Chron. 1872: 1099 1872.—FP(sensu): *H. meleagris*. *429*
H. fasciata* Fowlie, Orchid Digest 30: 281. 1966.—Coclé.
H. meleagris sensu FP. See H. burtii *429*
Hybochilus inconspicuous* (Kränzlin) Schltr., Rep. Sp. Nov. 16: 430. 1920.—Chiriquí.
H. leochilinus* (Reichb. f.) Mansf., Rep. Sp. Nov. 44: 58. 1938.—Chiriquí.

Ionopsis satyrioides* (Sw.) Reichb. f., Ann. Bot. Syst. 6: 683. 1861.—Canal Zone, Chiriquí, Colón.
I. utricularioides *478*
Isochilus major *329*

Jacquiniella aporophylla* (L. O. Wms.) Dressler, Taxon 15: 242. 1966.—Veraguas.
J. equitantifolia (Ames) Dressler, Taxon 15: 242. 1966.—FP(syn): *Epidendrum equitantifolium*. *285*
J. globosa* (Jacq.) Schltr., Rep. Sp. Nov. Beih. 7: 124. 1920.—Chiriquí, Coclé, Colón, Panamá.
J. pedunculata* Dressler, Orquideología 5: 24. 1970.—Colón.
J. standleyi* (Ames) Dressler, Taxon 15: 242. 1966.—Chiriquí.
J. teretifolia (Sw.) Britt. & Wilson, Sci. Surv. Porto Rico Virgin Isl. 6: 340. 1926.—FP(syn): *Epidendrum teretifolium*. *308*

Kefersteinia costaricensis Schltr., Bot. Centralbl. Beih. 36(2): 413. 1918.—FP(syn): *Chondrorhyncha costaricensis*. *422*
K. deflexipetala* Fowlie, Orchid Digest 30: 117. 1966.—Chiriquí.
K. lactea (Reichb. f.) Schltr., Rep. Sp. Nov. Beih. 19: 228. 1923.—FP(syn): *Chondrorhyncha lactea*. *422*
K. mystacina* (Reichb. f.) Reichb. f., Gard. Chron. n.s. 1: 34. 1874.—Darién.
K. parvilabris* Schltr., Rep. Sp. Nov. Beih. 19: 52. 1923.—Chiriquí, Coclé.
Kegeliella houtteana *380*
K. kupperi *380*
Koellensteinia kellneriana *416*

Laelia—see also *Schomburgkia*.

L. lueddemannii = Schomburgkia undulata 315
L. rubescens 314
Leochilus labiatus 547
L. scriptus 548
Lepanthes chiriquensis 187
L. eciliata 188
L. elata 188
L. eximia 190
L. insectiflora 190
L. lindleyana* Oerst. & Reichb. f., Xenia Orch. 1: 149. 1856.—Cited for Panama in VOI 4: 122. 1966.
L. maxonii 188
L. rotundifolia 189
L. turialvae 189
L. floripecten* (Reichb. f.) Ames, Bot. Mus. Leafl. 1(9): 11. 1933.—Cited for Panama in VOI 2: 186. 1961.
Ligeophila clavigera* (Reichb. f.) Garay, Bradea 2: 195. 1977.—Panamá.
Liparis elata = L. nervosa 243
L. fratrum* Schltr., Rep. Sp. Nov. Beih. 19: 92.1923.—Cited for Panama by Williams (Ceiba 5: 105. 1956).
Liparis fratrum* Schltr., Rep. Sp. Nov. Beih. 19: 92. 1923.—Cited for Panama by Williams (Ceiba 5: 105. 1956).
L. nervosa (Thunb.) Lindl., Gen. Sp. Orch. Pl. 26. 1830.—FP(syn): *L. elata*. 243
Lockhartia acuta 553
L. amoena 555
L. hercodonta* Reichb. f. ex Kränzlin, Pflanzenreich 83: 8. 1923.—Coclé, Panamá.
L. micrantha 556
L. obtusata 558
L. oerstedii 558
L. pittieri 559
Lycaste brevispatha 411
L. campbellii 411
L. leucantha* (Klotzsch) Lindl., Paxton's Flow. Gard. 2: 37. 1851.—Cited for Chiriquí by Fowlie (Genus *Lycaste* 47. 1970).
L. macrophylla 412
L. powellii 413
L. schilleriana* Reichb. f., Bonplandia 3: 67. 1855.—Chiriquí.
L. tricolor 415
L. xytriophora* Linden & Reichb. f., Saunder's Ref. Bot. 2: *t. 131*. 1872.—Cited for Darién by Fowlie (Genus *Lycaste* 65. 1970).

Macradenia brassavolae 571
Malaxis blephariglottis 241
M. excavata 238
M. fastigiata 240
M. histionantha (Link, Kl. & Otto) Garay & Dunsterv., VOI 6: 226. 1976.—FP(sensu): *M. parthonii*. 240
M. majanthemifolia 234
M. parthonii sensu FP. See M. histionantha 240
M. pittieri 236
M. simillima 238

M. soulei 236
M. tipuloides 242
M. wendlandii 242
M. woodsonii 239
Masdevallia—see also *Dryadella, Triaristella.*
M. allenii = Triaristella tridactylites 185
M. antioquiensis* Lehm. & Kränzlin, Bot. Jahrb. Syst. 26: 456. 1899.—Chiriquí.
M. attenuata 180
M. chontalensis 182
M. collina 180
M. ecaudata 182
M. erinacea* Reichb. f., Linnaea 41: 11. 1877.—Chiriquí, Colón, Panamá, Veraguas.
M. livingstoneana 182
M. nidifica* Reichb. f., Otia Bot. Hamb. 18. 1878.—Chiriquí.
M. pelecaniceps* Luer, Selbyana 3: 22. 1976.—Panamá.
M. picturata* Reichb. f., Otia Bot. Hamb. 16. 1878.—Chiriquí.
M. pleurothalloides* Luer, Selbyana 3: 218. 1977.—Panamá.
M. scabrilinguis* Luer, Phytologia 44: 168. 1979.—Chiriquí.
M. shizopetala* Kränzlin, Rep. Sp. Nov. Beih. 34: 92. 1925.—Bocas del Toro.
M. simula = Dryadella simula 185
M. tenuissima = Triaristella tenuissima 184
M. tonduzii Woolward, Bull. Herb. Boissier, Sēr. 2. 6: 82. 1906.—Bocas del Toro.
M. utriculata* Luer, Phytologia 44: 169. 1979.—Chiriquí.
M. zahlbruckneri* Kränzlin, Rep. Sp. Nov. 17: 413. 1921.—Panamá.
Maxillaria adendrobium* (Reichb. f.) Dressler, Taxon 13: 248. 1964.—Panamá.
M. alba 436
M. allenii 436
M. angustisegmenta 437
M. angustissima 437
M. arachnitiflora 438
M. biolleyi 439
M. brachybulbon 439
M. bracteata* (Schltr.) Ames & Correll, Bot. Mus. Leafl. 11: 14. 1943.—Bocas del Toro.
M. bradeorum 440
M. brevipes 440
M. brunnea Linden & Reichb. f., Bonplandia 2: 281. 1854.—FP(syn): *M. ringens* 463
M. camaridii 442
M. chartacifolia 443
M. conduplicata 443
M. confusa 444
M. crassifolia 445
M. ctenostachya 446
M. cucullata 446
M. dendrobioides 447
M. diuturna 448
M. exaltata 448
M. falcata* Ames & Correll, Bot. Mus. Leafl. 11: 15. 1943.—Chiriquí.
M. flava* Ames, Hubb. & Schweinf., Bot. Mus. Leafl. 3: 41. 1934.—Chiriquí.

M. friedrichsthalii 449
M. fulgens 451
M. horichii* Senghas, Orchidee (Hamburg) 28: 16. 1977.—Chiriquí.
M. inaudita 451
M. linearifolia* Ames & Schweinf., Sched. Orch. 10: 99. 1930.—Chiriquí.
M. longepetiolata 452
M. luteo-alba 454
M. maleolens 454
M. minor 455
M. nasuta* Reichb. f., Beitr. Orch. Centr.-Amer. 104. 1866.—Darién.
M. neglecta 455
M. oreocharis 457
M. paleata* (Reichb. f.) Ames & Correll, Bot. Mus. Leafl. 11: 15. 1943.—
Bocas del Toro, Chiriquí.
M. parvilabia 458
M. pittieri 458
M. planicola 460
M. reichenheimiana* Reichb. f., Gard. Chron. 1871: 1678. 1871.—Chiriquí.
M. repens 461
M. ringens = M. brunnea 463
M. rufescens 464
M. sanguinea* Rolfe, Kew Bull. 1895: 8. 1895.—Omitted from FP, but based
on material from Bocas del Toro.
M. speciosa* Reichb. f., Gard. Chron. n.s. 5: 197. 1876.—Coclé, Veraguas.
M. splendens* Poepp. & Endl., Nov. Gen. Sp. Pl. 1: 38. 1836.—Panamá.
M. umbratilis 464
M. uncata 465
M. vagans 466
M. valenzuelana 466
M. variabilis 467
M. wercklei 468
M. wrightii* (Schltr.) Ames & Correll, Bot. Mus. Leafl. 11: 18. 1943.—Coclé.
Mendoncella grandiflora (A. Rich.) A. D. Hawkes, Orquídea 25: 7. 1964.—
FP(syn): *Zygopetalum grandiflorum*. 417
Mesospinidium panamense Garay, Orchidee (Hamburg) 24: 185. 1973.—FP
(sensu): *M. warscewiczii*. 491
Miltonia endressii = Miltoniopsis warscewiczii 513
Miltoniopsis roezlii* (Reichb. f.) Godefroy-Lebeuf, Orchidophile 9: 148.
1889.—Coclé, Panamá, Veraguas.
M. warscewiczii (Reichb. f.) Garay & Dunsterv., VOI 6: 278. 1976.—FP(syn):
Miltonia endresii. 513
M. warscewiczii sensu FP. See M. panamense 491
Monophyllorchis maculata* Garay, Fl. Ecuador 9: 43. 1978.—Canal Zone,
Coclé, Colón, Veraguas.
Mormodes atropurpureum 355
M. cartonii* Hook., Bot. Mag. 72: *t. 4214*. 1846.—FP(in part): *M. igneum* 357
M. colossus (See also M. powellii.) 355
M. hookeri 356
M. igneum (See also M. cartonii.) 357
M. lancilabris* Pabst. Ann. Missouri Bot. Gard. 62: 510. 1975.—Coclé.
M. powellii* Schltr., Rep. Sp. Nov. Beih. 17: 55. 1922.—FP(in syn): *M.*
colossus. 355

Neomoorea irrorata 386

Nidema boothii (Lindl.) Schltr., Rep. Sp. Nov. Beih. 17: 43. 1922.—FP(syn): *Epidendrum boothii*. 255
N. ottonis (Reichb. f.) Britt. & Millsp., Bahama Fl. 94. 1920.—FP(syn): *Epidendrum ottonis*. 264
Notylia albida Klotzsch, Allg. Gartenzeitung, 1851: 21. 1851.—FP(syn): *N. panamensis* 569
N. barkeri 567
N. cordesii 568
N. juncta* Dressler, Orquideología 4: 164. 1969.—Panamá.
N. lankesteri* Ames, Sched. Orch. 5: 34. 1923.—Cited for Panama by Williams (Ceiba 5: 241. 1956).
N. latilabia 568
N. linearis* Ames & Schweinf., Sched. Orch. 8: 72. 1925.—Coclé, Darién, Panamá.
N. panamensis = N. albida 569
N. pentachne 569
N. ramonensis* Schltr., Rep. Sp. Nov. Beih. 19: 250. 1923.—Chiriquí.
N. simplex* Dressler, Orquideología 4: 166. 1969.—Panamá.
Oakes-amesia—see *Sphyrastylis*.
O. cryptantha = Sphyrastylis cryptantha 565
Octomeria costaricensis* Schltr., Rep. Sp. Nov. Beih. 19: 111. 1923.—Colón.
O. hondurensis* Ames, Bot. Mus. Leafl. 1(4): 1. 1933.—Colón.
O. valerioi* Ames & Schweinf., Sched. Orch. 10: 51. 1930.—Chiriquí.
Odontoglossum—see also *Oncidium, Osmoglossum, Otoglossum, Rossioglossum*.
O. bictoniense* (Batem.) Lindl., Bot. Reg. 26: *t.* 66. 1840.—Chiriquí.
O. cariniferum = Oncidium cariniferum 493
O. chiriquense = Otoglossum chiriquense 494
O. convallarioides = Osmoglossum convallarioides 495
O. egertonii = Osmoglossum egertonii 495
O. krameri* Reichb. f., Gard. Chron. 1868: 98. 1868.—Chiriquí, Panamá.
O. oerstedii 496
O. maculata* (Lindl.) Lindl., Gen. Sp. Orch. Pl. 237. 1833.—Canal Zone.
O. schlieperianum = Rossioglossum schlieperianum. See also R. powellii 498
Oncidium—see also *Psygmorchis*.
O. ampliatum 517
O. ansiferum 519
O. baueri 519
O. bracteatum 521
O. cabagrae 521
O. cariniferum (Reichb. f.) Beer, Prakt. Stud. Orch. 283. 1854.—FP(syn): *Odontoglossum cariniferum*. 493
O. carthaginense 522
O. cheirophorum 524
O. crista-galli 525
O. ebrachiatum = O. nudum 527
O. ensatum 527
O. fuscatum* Reichb. f., Ann. Bot. Syst. 6: 763. 1863.—Panamá.
O. globuliferum 528
O. heteranthum 530
O. ishmi 531
O. klotzschianum Reichb. f., Bot. Zeit. 10: 695. 1852.—FP(sensu): *O. nebulosum* 533

O. kramerianum 532
O. luteum* Rolfe, Kew Bull. 1893: 172. 1893.—Veraguas.
O. nebulosum sensu FP. See O. klotzchianum 533
O. nudum Batem., Bot. Reg. 23: *t. 1994*. 1837.—FP(syn): *O. ebrachiatum* 527
O. obryzatum 533
O. ochmatochilum 534
O. panamense 535
O. panduriforme 536
O. parviflorum 536
O. powellii 538
O. pusillum = Psygmorchis pusilla 540
O. schroederianum* Garay & Stacey, Bradea 1: 408. 1974.—Chiriquí.
O. stenotis 541
O. stipitatum 542
O. teres 544
O. warscewiczii 545
Ornithocephalus bicornis 561
O. cochleariformis 562
O. gladiatus Hook., Exot. Fl. 2: *t. 127*. 1824..—FP(syn): *O. inflexus* (fide Dunsterville & Garay, VOI 3: 230. 1961). 563
O. inflexus = O. gladiatus 563
O. powellii 563
Osmoglossum convallarioides Schltr., Rep. Sp. Nov. Beih. 19: 148. 1923.—FP(syn): *Odontoglossum convallarioides*. 495
O. egertonii (Lindl.) Schltr., Orchis 10: 166. 1916.—FP(syn): *Odontoglossum egertonii* 495
Otoglossum chiriquense (Reichb. f.) Garay & Dunsterv., VOI 6: 41. 1976.—FP(syn): *Odontoglossum chiriquense*. 494

Pachyphyllum hispidulum* (Reichb. f.) Garay & Dunsterv., VOI 3: 236. 1965.—Chiriquí.
Palmorchis powelli 144
P. silvicola* L. O. Wms., Fieldiana: Bot. 32: 199. 1970.—Chiriquí, Veraguas.
P. trilobulata 144
Paphinia clausula* Dressler, Taxon 15: 242. 1966.—Bocas del Toro.
P. cristata* Lindley, Bot. Reg. 29: misc. 14. 1843.—Coclé.
Pelexia funckiana (A. Rich. & Gal.) Schltr., Rep. Sp. Nov. 15: 197. 1918.—FP(syn): *Spiranthes funckiana*. 158
Peristeria elata 384
P. pendula* Hook., Bot. Mag. 63: *t. 3479*. 1836.—Cited for Darién by Dunn (Amer. Orchid Soc. Bull. 20: 82. 1951); I believe that then identification was based on a photograph, and that no specimen was preserved. 427
Pescatorea cerina 116
P. dayana* Reichb. f., Gard. Chron. 1872: 1618. 1872.—Cited for Darién by Fowlie (Orchid Digest 32: 87. 1968).
Phragmipedium caudatum see P. warscewiczianum 116
P. dariense* (Reichb. f.) Garay, Orchid Digest 43: 141. 1979.—Cited for Panama by Garay (loc. cit.), but this species may be based on Colombian material.
P. hincksianum* (Reichb. f. Garay, Orchid Digest 43: 144. 1979.—FP(syn): *P. longifolium* 116
P. longifolium (See also P. hincksianum) 116

P. roezlii* (Reichb. f.) Garay, Orchid Digest 43: 145. 1979.—Cited for Panama by Garay (loc. cit.).
P. warscewiczianum (Reichb. f.) Garay, Orchid Digest 43: 140. 1979.—FP(in syn): *P. caudatum*. *116*
Phymatidium panamense* Dressler, Orquideología 6: 142. 1971.—Panamá.
Physosiphon minutiflorus = Pleurothallis deregularis *176*
Platyglottis coriacea *327*
Platystele calymma* Luer, Selbyana 3: 226. 1977.—Panamá.
P. caudatisepala* (C. Schweinf.) Garay, Orquideología 9: 119. 1974.—Panamá.
P. compacta* (Ames) Ames, Proc. Biol. Soc. Wash. 35: 85. 1922.—Chiriquí.
P. dressleri* Luer, Selbyana 3: 26. 1976.—Colón, Panamá.
P. jungermannioides* (Schltr.) Garay, Orquideología 9: 120. 1974.—Colón.
P. lancilabris* (Reichb. f.) Schltr., Rep. Sp. Nov. Beih. 19: 102. 1923.—Coclé.
P. minimiflora* (Schltr.) Garay, Orquideología 9: 120. 1974.—Colón, Panamá.
P. perpusilla (Reichb. f.) Garay, Orquideología 9: 120. 1974.—FP(syn): *Pleurothallis perpusilla* (as doubtful species). *234*
P. stenostachya (Reichb. f.) Garay, Caldasia 8: 320. 1962.—FP(syn): *Pleurothallis stenostachya*. *223*
P. taylori* Luer, Selbyana 3: 30. 1976.—Panamá.
Platythelys maculata* (Hook.) Garay, Bradea 2: 197. 1977.—Coclé, Veraguas.
P. venustula* (Ames) Garay, Bradea 2: 198. 1977.—Chiriquí.
Plectrophora alata* (Rolfe) Garay, Bot. Mus. Leafl. 21: 261. 1967.—Chiriquí.
Pleurothallis—see also *Dresslerella* and *Restrepia*.
P. aberrans* Luer, Selbyana 2: 382. 1978.—Veraguas.
P. abjecta* Ames, Sched. Orch. 5: 14. 1923.
P. acostaei* Schltr., Rep. Sp. Nov. Beih. 19: 295. 1923.
P. acrisepala* Ames & Schweinf., Sched. Orch. 8: 22. 1925.—FP(in syn): *P. brighamii* *210*
P. alexandrae* Schltr., Rep. Sp. Nov. Beih. 19: 103. 1923.—FP(in syn): *P. uncinata*. *208*
P. allenii *205*
P. alpina *212*
P. amygdalodora* Kränzlin, Bot. Jahrb. Syst. 37: 521. 1906.—Panamá.
P. annectans* Luer, Selbyana 3: 240. 1977.—Chiriquí.
P. antonensis *199*
P. archicolonae* Luer, Selbyana 3: 52. 1976.—Colón, Panamá.
P. areldii* Luer, Selbyana 2: 383. 1978.—Chiriquí
P. arietina *199*
P. aristata *226*
P. barboselloides* Schltr., Rep. Sp. Nov. Beih. 17: 18. 1922.—FP(in syn): *P. brighamii*. *210*
P. barbulata* Lindl., Folia Orch. *Pleurothallis* 40. 1859.—Colón, Panamá.
P. blaisdellii *196*
P. brighamii (See also P. acrisepala & P. barboselloides.) *210*
P. broadwayi = P. foliata *194*
P. broadwayi var. *tricarinata* See P. carinilabia *194*
P. butcheri* L. O. Wms., Fieldiana: Bot. 29: 346. 1961.—Chiriquí.
P. cactantha* Luer, Selbyana 3: 72. 1976.—Panamá.
P. calyptrostele (See also P. geminiflora.) *225*
P. campicola* Luer, Selbyana 5: 161. 1979.—Chiriquí.
P. cardiochila *197*
P. cardiothallis* Reichb. f., Bot. Zeit. 15: 158. 1857.—Chiriquí, Veraguas.
P. carinilabia* Luer, Selbyana 3: 256. 1977.—FP(in syn): *P. broadwayi* var. *tricarinata*. *194*

P. carnosilabia* Heller & Hawkes, Phytologia 14: 9. 1966.—Veraguas.
P. carpinterae* Schltr., Rep. Sp. Nov. Beih. 19: 105. 1923.—Chiriquí. Veraguas.
P. cedralensis* Ames, Sched. Orch. 4: 18. 1923.—Coclé, Chiriquí.
P. ciliaris (Lindl.) L. O. Wms., Caldasia 5: 14. 1942.—FP(syn): *P. gnomifera*. ... *195*
P. citrophila* Luer, Selbyana 3: 266. 1977.—Coclé.
P. cobraeformis ... *203*
P. cogniauxiana ... *217*
P. concaviflora ... *202*
P. condylata* Luer, Selbyana 3: 80. 1976.—Chiriquí.
P. congruens* Luer, Selbyana 2: 391. 1978.—Colón, Panamá.
P. convallaria* Schltr., Rep. Sp. Nov. Beih. 19: 185. 1923.—Veraguas.
P. corniculata* (Sw.) Lindl., Bot. Reg. 28: misc. 83. 1842.
P. costaricensis* Rolfe, Kew Bull. 1917: 80. 1917.—Veraguas.
P. crenata = P. tripterantha ... *232*
P. crocodiliceps* Reichb. f., Bonplandia 3: 72. 1855.—FP(in part): *P. arietina* ... *199*
P. cucumeris* Luer, Selbyana 5: 162. 1979.—Chiriquí.
P. cuspidata* Luer, Selbyana 3: 282. 1977.—Chiriquí
P. decipiens Ames & Schweinf., Sched. Orch. 8: 26. 1925..—FP(syn): *P. pterocaulis*. ... *214*
P. dentipetala* Rolfe ex Ames, Sched. Orch. 3: 7. 1923.—Chiriquí.
P. deregularis (Barb.-Rodr.) Luer, Selbyana 2: 385. 1978.—FP(syn): *Physosiphon minutiflorus*. ... *176*
P. dolichopus = P. sclerophylla ... *230*
P. dressleri* Luer, Selbyana 3: 98. 1976.—Panamá.
P. dura* Lindl., Folia Orchid. *Pleurothallis* 32. 1859.—Chiriquí.
P. ellipsophylla ... *222*
P. endotrachys Reichb. f., Linnaea 41: 95. 1876.—FP(syn): *P. pfavii* ... *230*
P. eumecocaulon ... *205*
P. excavata* Schltr., Rep. Sp. Nov. Beih. 19: 287. 1923.—Coclé.
P. filamentosa = Restrepia filamentosa ... *232*
P. foliata Griseb., Fl. Brit. W. Indies 610. 1864.—FP(syn): *P. broadwayi*. ... *194*
P. fuegii ... *226*
P. fulgens ... *211*
P. gelida ... *218*
P. geminiflora* Ames, Hubb. & Schweinf., Bot. Mus. Leafl. 3: 39. 1934.—FP (in syn): *P. calyptrostele*. ... *225*
P. ghiesbrechtiana = P. racemiflora ... *229*
P. glandulosa ... *212*
P. gnomifera = P. ciliaris ... *195*
P. gnomonifera = P. memor ... *195*
P. grobyi (See also P. picta.) ... *224*
P. guttata* Luer, Selbyana 3: 116. 1976.—Panamá.
P. harpago* Luer, Selbyana 5: 167. 1979.—Darién.
P. hirsuticaulis* Ames & Schweinf., Sched. Orch. 10: 29. 1930.—Veraguas.
P. hispida = Dresslerella hispida ... *209*
P. homalanthoides* Schltr., Rep. Sp. Nov. Beih. 19: 190. 1923.—Cited for Panama by Williams (Ceiba 5: 82. 1956).
P. homolantha ... *201*
P. imago* Luer, Selbyana 3: 318. 1977.—Coclé, Panamá.
P. immersa* Linden & Reichb. f., Bonplandia 3: 224. 1855.—Chiriquí.
P. imraei* Lindl., Folia Orchid. *Pleurothallis* 9. 1859.—Chiriquí, Coclé, Panamá.
P. instar* Luer, Selbyana 3: 320. 1977.—Chiriquí.

P. intricata* Lindl., Orchid. Linden. 1. 1846.—Panamá.
P. isthmica* Luer, Selbyana 3: 322. 1977.—Chiriquí.
P. johnsonii* Ames, Sched. Orch. 2: 21. 1923.—Coclé.
P. lappiformis* Heller & L. O. Wms., Fieldiana: Bot. 31: 42. 1964.—Coclé, Colón, Panamá.
P. lepidota *217*
P. lewisae* Ames, Proc. Biol. Soc. Wash. 44: 41. 1931.—Canal Zone, Panamá.
P. longipedicellata* Ames & Schweinf., Sched. Orch. 8: 77. 1925.—Chiriquí.
P. loranthophylla* Reichb. f., Bot. Zeit. 10: 674. 1852.—Veraguas.
P. luctuosa* Reichb. f., Linnaea 41: 48. 1877.—Chiriquí.
P. macrantha *227*
P. mammillata* Luer, Selbyana 3: 138. 1976.—Colón, Panamá.
P. membraniflora* C. Schweinf., Bot. Mus. Leafl. 5: 91. 1938.
P. memor Reichb. f., Bonplandia 4: 330. 1856.—FP(syn): *P. gnomonifera* (fide Garay & Sweet, Fl. Lesser Antilles, Orchidaceae 101. 1974). *195*
P. microphylla* A. Rich. & Gal., Ann. Sci. Nat. Bot., sér. 3. 3: 17. 1845.
P. minutipetala* Ames & Schweinf., Sched. Orch. 10: 32. 1930.
P. monocardia* Reichb. f., Bonplandia 3: 72. 1855.
P. moschata* Reichb. f., Xenia Orch. 3: 42. 1881.
P. muricata *231*
P. mystax* Luer, Selbyana 3: 146. 1976.—Veraguas.
P. nitida* Luer, Selbyana 3: 352. 1977.—Chiriquí.
P. octomeriae *206*
P. orbicularis (Lindl.) Lindl., Bot. Reg. 28: misc. 79. 1842.—FP(syn): *P. rotundata*. *196*
P. oscitans* Ames, Bot. Mus. Leafl. 2: 25. 1934.—Coclé, Panamá.
P. ovatilabia *224*
P. pallida* Luer, Selbyana 3: 358. 1977.—Coclé.
P. pan* Luer, Selbyana 3: 360. 1977.—Panamá, Veraguas.
P. peculiaris* Luer, Selbyana 3: 158. 1976.—Veraguas.
P. peduncularis* Lindl., Bot. Reg. 29: misc. 47. 1843.—Chiriquí.
P. pergrata* Ames, Sched. Orch. 4: 24. 1923.—Coclé.
P. perpusilla = Platystele perpusilla *234*
P. pfavii = P. endotrachys *230*
P. phyllocardioides* Schltr., Rep. Sp. Nov. Beih. 19: 193. 1923.—Cited for Panama by Williams (Ceiba 5: 89. 1956).
P. picta* Lindl., Bot. Reg. 21: sub. *t. 1797*. 1835.—FP(in syn): *P. grobyi*. *224*
P. pittieri* Schltr., Rep. Sp. Nov. 3: 247. 1907.—FP(in syn): *P. velaticaulis* *218*
P. platysepala* Schltr., Rep. Sp. Nov. Beih. 7: 111. 1920.
P. polygonoides* Griseb., Fl. Brit. W. Indies 609. 1864.—Chiriquí, Panamá.
P. polysticha* Luer, Selbyana 5: 176. 1979.—Darién.
P. powellii *228*
P. praegrandis *222*
P. pruinosa *227*
P. pterocaulis = P. decipiens *214*
P. racemiflora Lindl. ex Lodd., Bot. Cab. 10: *t. 949*. 1824.—FP(syn): *P. ghiesbreghtiana*. *229*
P. ramonensis* Schltr., Rep. Sp. Nov. Beih. 19: 193. 1923.—Chiriquí.
P. rhodoglossa *198*
P. rotundata = P. orbicularis *196*
P. rowleei *221*
P. rubella* Luer, Selbyana 3: 378. 1977.—Chiriquí.
P. ruscifolia *206*
P. sanchoi* Ames, Sched. Orch. 4: 26. 1923.—Chiriquí.

P. scandens* Ames, Sched. Orch. 5: 18. 1923.—Colón, Panamá.
P. scitula* Luer, Selbyana 3: 384. 1977.—Chiriquí.
P. sclerophylla Lindl., Bot. Reg. 21: sub. *t. 1979*. 1835.—FP(syn): *P. dolichopus* 230
P. segoviensis 229
P. segregatifolia* Ames & Schweinf., Sched. Orch. 8: 33. 1925.
P. sempergemmata* Luer, Selbyana 3: 386. 1977.—Chiriquí.
P. simulans 201
P. speciosa* Luer, Selbyana 3: 392. 1977.—Chiriquí.
P. spectabilis 231
P. stenostachya = Platystele stenostachya 223
P. subserrata = Restrepia subserrata 233
P. tantilla* Luer, Selbyana 5: 183. 1979.—Coclé, Panamá.
P. telamon* Luer, Selbyana 5: 185. 1979.—Coclé.
P. thymochils* Luer, Selbyana 3: 398. 1977.—Panamá.
P. titan* Luer, Selbyana 3: 400. 1977.—Chiriquí.
P. tonduzii* Schltr., Beih. Bot. Centralbl. 36(2): 397. 1918.—Chiriquí.
P. trachychlamys 205
P. triangulabia 198
P. tribuloides 208
P. tripterantha Reichb. f., Bonplandia 2: 24. 1854.—FP(sensu): *P. crenata*. 232
P. tuerckheimii 228
P. uncinata (See also P. alexandrae.) 208
P. vaginata* Schltr., Rep. Sp. Nov. Beih. 19: 56. 1923.—Chiriquí.
P. velaticaulis (See also P. pittieri.) 218
P. veraguacensis* Luer, Selbyana 3: 402. 1977.—Veraguas.
P. verecunda 214
P. vittata 217
P. volcanica* Luer, Selbyana 3: 406. 1977.—Chiriquí.
P. xanthophthalma = Restrepia xanthophthalma 233
Pogonia—see *Cleistes, Triphora*.
P. cubensis = Triphora gentianoides 125
P. mexicana = Triphora mexicana 125
P. rosea = Cleistes rosea 123
P. wagneri = Triphora wagneri 125
Polycycnis—for key to species, see Orquideología 12: 117. 1977.
P. barbata* (Lindl.) Reichb. f., Bonplandia 3: 218. 1855.—Chiriquí. (See also P. gratiosa.)
P. gratiosa Endres & Reichb. f., Gard. Chron. 1871: 1451. 1871.—FP(sensu): *P. barbata*. 389
P. lehmannii* Rolfe, Kew Bull. 1894: 365. 1894.—Darién.
P. musicfera* (Lindl. & Paxt.) Reichb. f., Bonplandia 3: 218. 1855.—Chiriquí.
P. ornata* Garay, Canad. Jour. Bot. 34: 256. 1956.—Darién.
P. tortuosa* Dressler, Orquideología 12: 120. 1977.—Coclé.
Polystachya cerea = P. foliosa 331
P. foliosa (Hook.) Reichb. f., Ann. Bot. Syst. 6: 640. 1863.—FP(syn): *P. cerea* 331
P. masayensis 332
Ponthieva brenesii* Schltr., Rep. Sp. Nov. Beih. 19: 165. 1923.—FP(syn): *P. maculata*. 150
P. ephippium 150
P. maculata (See also P. brenesii.) 150
P. racemosa 150
Prescottia oligantha 146

P. stachyodes *147*
Psilochilus macrophyllus* (Lindl.) Ames, Orchidaceae 7: 45. 1922.—Cited for Chiriquí by Hawkes (Orchid Weekly 4: 421. 1954), but may refer to another species.
Psygmorchis pumilio* (Reichb. f.) Dodson & Dressler, Phytologia 24: 288. 1972.—Chiriquí.
P. pusilla (L.) Dodson & Dressler, Phytologia 24: 288. 1972.—FP(syn): *Oncidium pusillum*..... *540*
Pterichis costaricensis* Ames & Schweinf., Sched. Orch. 10: 10. 1930.—Bocas del Toro.

Reichenbachanthus reflexus* (Lindl.) Brade, Rodriguezia 1: 55. 1935.—Colón, Panamá.
Restrepia filamentosa Ames & Schweinf., Orchidaceae 8: 19. 1925.—FP(syn): *Pleurothallis filamentosa*. *232*
R. subserrata Schltr., Rep. Sp. Nov. Beih. 19: 291. 1923.—FP(syn): *Pleurothallis subserrata*. *233*
R. xanthophthalma Reichb. f., Hamburger Garten-Blumezeitung 21: 300. 1865.—FP(syn): *Pleurothallis xanthophthalma*..... *233*
Restrepiopsis tubulosa* (Lindl.) Luer, Selbyana 2: 200. 1978.—Cited for Panama in VOI 4: 266. 1966.
R. ujarensis* (Reichb. f.) Luer, Selbyana 2: 200. 1978.—Chiriquí
R. viridula* (Lindl.) Luer, Selbyana 2: 200. 1978.
Rodriguezia compacta *479*
R. lanceolata Ruiz & Pavón, Syst. Fl. Peru. Chil. 1: 219. 1798.—FP(syn): *R. secunda* *480*
R. secunda = R. lanceolata *480*
Rossioglossum powellii* (Schltr.) Garay & Kennedy, Orchid Digest 40: 142. 1976.—FP(in syn): *Odontoglossum schlieperianum*. *498*
R. schlieperianum (Reichb. f.) Garay & Kennedy, Orchid Digest 40: 143. 1976.—FP(syn): *Odontoglossum schlieperianum*. *498*
Rudolfiella picta (Schltr.) Hoehne, Fl. Bras. 12(7): 51. 1953.—FP(syn): *Bifrenaria picta*..... *409*

Salpistele brunnea* Dressler, Orquideología 14: 6. 1979.—Chiriquí, Coclé, Veraguas.
S. lutea* Dressler, Orquideología 14: 8. 1979.—Chiriquí.
Sarcoglottis acaulis (J. E. Sm.) Schltr., Rep. Sp. Nov. Beih. 6: 53. 1919.—FP(syn): *Spiranthes acaulis*. *156*
Scaphosepalum clavellatum* Luer, Selbyana 3: 32. 1976.—Panamá.
S. elasmotopus *186*
S. microdactylum* Rolfe, Kew Bull. 1893: 335. 1893.—Chiriquí.
S. punctatum* (Rolfe) Kränzlin, Rep. Sp. Nov. Beih. 34: 217. 1925.—Chiriquí.
S. standleyi* Ames, Sched. Orch. 9: 24. 1925.—Cited for Chiriquí by Hawkes (Orchid Weekly 4: 66. 1962).
S. viviparum* Luer, Selbyana 2: 390. 1978.—Veraguas.
Scaphyglottis acostaei *320*
S. amethystina *322*
S. amparoana* (Schltr.) Dressler, Taxon 13: 247. 1964.—Chiriquí, Colón, Veraguas.
S. behrii = S. graminifolia *322*
S. bilineata *325*
S. brachyphylla* (Reichb. f.) C. Schweinf., Bot. Mus. Leafl. 10: 28. 1941.—Chiriquí.

S. cuneata = S. prolifera 320
S. gigantea* Dressler, Orquídea (Méx.) 7: 234. 1979.—Chiriquí.
S. graminifolia (Ruiz & Pavón) Poepp. & Endl., Nov. Gen. Sp. 1: 59. 1836.—FP(syn): *S. behrii*. 322
S. jimenezii* Schltr., Beih. Bot. Centralbl. 36(2): 399. 1918.—Chiriquí.
S. laevilabia 321
S. lindeniana 320
S. longicaulis 321
S. mesocopis 323
S. micrantha 319
S. minutiflora 323
S. prolifera Cogn., Fl. Bras. 3(5): 15. 1898.—FP(syn): *S cuneata*. 320
S. punctulata* (Reichb. f.) Schweinf., Bot. Mus. Leafl. 17: 47. 1955.—Chiriquí, Darién, Panamá.
S. spathulata* C. Schweinf., Bot. Mus. Leafl. 10: 28. 1941.—Coclé.
S. stenotepala* (Reichb. f.) C. Schweinf., Bot. Mus. Leafl. 10: 23: 1941.—Cited for Panama by Williams (Ceiba 5: 158. 1956).
S. tenella 325
Schomburgkia undulata Lindl., Bot. Reg. 30: misc. 13. 1844.—FP(syn): *Laelia lueddemannii*. 315
Selenipedium chica 114
Sepalosaccus strumatum* (Endres & Reichb. f.) Garay, Caldasia 8: 525. 1962.—Chiriquí.
Sievekingia butcheri* Dressler, Orquideología 13: 221. 1979.—Coclé.
S. fimbriata* Reichb. f., Flora 69: 449. 1886.—Coclé, Panamá.
S. suavis 378
Sigmatostalix abortiva 549
S. brownii* Garay, Caldasia 10: 236. 1968.—Chiriquí?
S. guatemalensis 551
S. hymenantha 551
S. picturatissima Kränzlin, Pflanzenreich 80: 312. 1922.—FP(syn): *S. racemifera* (fide Garay, Orquideología 9: 141. 1974). 552
S. racemifera = S. picturatissima 552
Sobralia allenii 134
S. amabilis 136
S. atropubescens Ames & Schweinf., Sched. Orch. 10: 2. 1930.—FP(syn): *S. decora* var. *aerata*. 140
S. bletiae 136
S. bouchei 136
S. callosa 137
S. decora var. *aerata* = S. atropubescens 140
S. fenzliana Reichb. f., Bot. Zeit. 10: 714. 1852.—FP(syn): *S. panamensis*. . 137, 140
S. fragrans 137
S. labiata 138
S. leucoxantha sensu FP. See S. powellii 138
S. lindleyana 138
S. macrophylla Reichb. f., Bot. Zeit. 10: 713. 1852.—FP(syn): *S. rolfeana*. 140
S. panamensis = S. fenzliana 137, 140
S. powellii Schltr., Rep. Sp. Nov. Beih. 17: 11. 1922.—FP(sensu): *S. leucoxantha*. 138
S. rolfeana = S. macrophylla 140
S. suaveolens 142
S. undatocarinata* C. Schweinf., Bot. Mus. Leafl. 6: 197. 1938.—Chiriquí.
S. valida 142

S. warszewiczii 143
Solenocentrum costaricense* Schltr., Rep. Sp. Nov. 9: 163. 1911.—Chiriquí.
Spathoglottis plicata* Blume, Bijdr. 401. 1825.—Naturalized, Canal Zone, Colón.
Sphyrastylis cryptantha (Schweinf. & Allen) Garay, Bot. Mus. Leafl. 21: 264. 1967.—FP(syn): *Oakes-amesia cryptantha* 565
Spiranthes—see *Beloglottis, Brachystele, Cyclopogon, Pelexia, Sarcoglottis, Stenorrhynchos.*
S. acaulis = Sarcoglottis acaulis 156
S. costaricensis = Beloglottis costaricensis 154
S. funckiana = Pelexia funckiana 158
S. guyanensis = Brachystele guyanensis 153
S. navarrensis = Stenorrhynchos navarrensis 157
S. orchioides = Stenorrhynchos lanceolatum 158
S. prasophylla = Cyclopogon prasophyllum 154
S. speciosa = Stenorrhynchos speciosum 157
S. (=Sarcoglottis?) woodsonii 155
Stanhopea cirrhata* Lindl., Jour. Hort. Soc. London 3: 37. 1850.—Chiriquí.
S. costaricensis Reichb. f., Hamburger Garten-Blumenzeitung 16: 424. 1860.—FP(sensu, in part): *S. graveolens* 390
S. ecornuta* Lem., Fl. Serres 2: *t. 181.* 1846.—Bocas del Toro.
S. graveolens See S. costaricensis 390
S. oculata 391
S. pulla 392
S. wardii 394
Stelis aemula 174
S. allenii 164
S. aprica Lindl., Companion Bot. Mag. 2: 353. 1836.—FP(syn): *S. hymenantha* (fide Dunsterville & Garay, VOI 4: 288. 1966). 169
S. argentata Lindl., Bot. Reg. 28: misc. 64. 1842.—FP(syn): *S. endresii* (fide Dunsterville & Garay, VOI 1: 414. 1959). 171
S. atrorubens 166
S. biserrula* Lindl., Folia Orch. *Stelis* 16. 1858.—Coclé, Veraguas.
S. collina 175
S. cooperi* Schltr., Rep. Sp. Nov. 3: 276. 1907.—Cited for Panama by Williams (Ceiba 5: 50. 1956).
S. crescentiicola 169
S. despectans 165
S. endresii = S. argentata 171
S. fimbriata* R. K. Baker, Ann. Missouri Bot. Gard. 55: 68. 1968.—Panamá.
S. gratiosa* Luer, Selbyana 5: 193. 1979.—Panamá
S. hymenantha = S. aprica 169
S. inaequalis 164
S. leucopogon 169
S. longipetiolata 175
S. maxonii 173
S. microchila 165
S. montana 166
S. panamensis 173
S. powellii 172
S. purpurea* (Ruiz & Pavón) Willd., Sp. P. 4: 150. 1805.—Panamá.
S. skutchii 167
S. spathulata* Poepp. & Endl., Nov. Gen. Sp. Pl. 1: 46. 1836.—Cited for Panama in VOI 5: 302. 1972.

S. storkii 172
S. triaristata* Luer, Selbyana 5: 193. 1979.—Panamá.
S. umbelliformis* Hespenheide & Dressler, Orquideología 6: 21. 1971.—Colón, Panamá.
S. vestita 174
S. williamsii 175
Stellilabium minutiflorum* (Kränzlin) Garay, Jour. Arnold Arbor. 50: 466. 1969.—Chiriquí, Coclé, Panamá.
Stenoptera costaricensis 145
Stenorrhynchos lanceolatum (Aubl.) L. C. Rich. ex Spreng., Syst. Veg. 3: 710. 1826.—FP(syn): *Spiranthes orchioides*. 158
S. navarrensis Ames, Sched. Orch. 9: 13. 1925.—FP(syn): *Spiranthes navarrensis*. 157
S. speciosum (Gmel.) L. C. Rich. ex Spreng., Syst. Veg. 3: 109. 1826.—FP(syn): *Spiranthes speciosa* 157
Systeloglossum panamense* Dressler & N. H. Wms., Amer. Orchid Soc. Bull. 39: 326. 1970.—Chiriquí, Panamá, Veraguas.
Telipogon ampliflorus* C. Schweinf., Bot. Mus. Leafl. 6: 34. 1938.—Cited for Panama by Williams (Ceiba 5: 243. 1956). 572
T. dendriticus 572
T. endresianum* Kränzlin, Ann. Nathist. Hofmus. 33: 33. 1919.—Chiriquí.
T. radiatus 572
Teuscheria pickiana* (Schltr.) Garay, Rhodora 61: 41. 1959.—Canal Zone, Chiriquí, Colón.
Trevoria zahlbruckneriana* (Schltr.) Garay, Orquideología 5: 8. 1970.—Veraguas.
Triaristella dressleri* (Luer) Luer, Selbyana 2: 205. 1978.—Coclé, Panamá.
T. huebneri* (Schltr.) Luer, Selbyana 2: 205. 1978.—Bocas del Toro, Veraguas.
T. reichenbachii* Brieg. ex Luer, Selbyana 2: 206. 1978.—Veraguas.
T. tenuissima (C. Schweinf.) Luer, Selbyana 2: 206. 1978.—FP(syn): *Masdevallia tenuissima*. 184
T. tridactylites (Reichb. f.) Luer. Selbyana 2: 206. 1978.—FP(syn): *Masdevallia allenii*. 185
Trichocentrum caloceras* Endres & Reichb. f., Gard. Chron. 1871: 1257. 1871.—Chiriquí.
T. capistratum Reichb. f., Gard. Chron. 1871: 1257. 1871.—FP(syn): *Trichocentrum panamense* Rolfe. 476 476
T. panamense = T. capistratum 476
T. pfavii* Reichb. f., Gard. Chron. n.s. 16: 70. 1881.—Chiriquí. 482
Trichopilia leucoxantha 484
T. maculata 486
T. marginata 488
T. suavis 488
T. subulata 490
T. turialbae 469
Trigonidium egertonianum 471
T. lankesteri 125
Triphora gentianoides (Sw.) Ames & Schltr., Orchidaceae 7: 5. 1922.—FP(syn): *Pogonia cubensis*. 125
T. mexicana (S. Wats.) Schltr., Rep. Sp. Nov. Beih. 17: 139. 1921.—FP(syn): *Pogonia mexicana*. 125 125
T. wagneri Schltr., Rep. Sp. Nov. 17: 139. 1923.—FP(syn): *Pogonia wagneri*. ...

Trizeuxis falcata *481*

Uleiorchis ulaei* (Cogn.) Handro, Arq. Bot. Estado São Paulo, n. s., f. m. 3: 175. 1955.—Canal Zone.
Vanilla pauciflora* Dressler, Orquideología 13: 229. 1979.—Panamá.
V. pfaviana* Reichb. f., Gard. Chron. n. s. 20: 230. 1883.—Chiriquí.
V. planifolia *126*
V. pompona *128*
Warrea costaricensis *352*
Warreopsis parviflora (L. O. Wms.) Garay, Orquideología 8: 51. 1973.—FP(syn): *Zygopetalum parviflorum*. *419*
Wullschlaegelia aphylla* (Sw.) Reichb. f., Bot. Zeit. 21: 131. 1863.—Coclé.
W. calcarata* Benth., Jour. Linn. Soc. Bot. 18: 342. 1881.—Colón, Panamá.

Xylobium colleyi* (Batem. ex Lindl.) Rolfe, Gard. Chron. Ser. 3. 7: 288. 1890.—Colón.
X. elongatum *406*
X. foveatum *407*
X. powellii *407*

Zygopetalum—see *Mendoncella, Warreopsis.*
Z. grandiflorum = Mendoncella grandiflora *417*
Z. parviflorum = Warreopsis parviflora *419*

Missouri Botanical Garden Library
3 1753 00204 2676